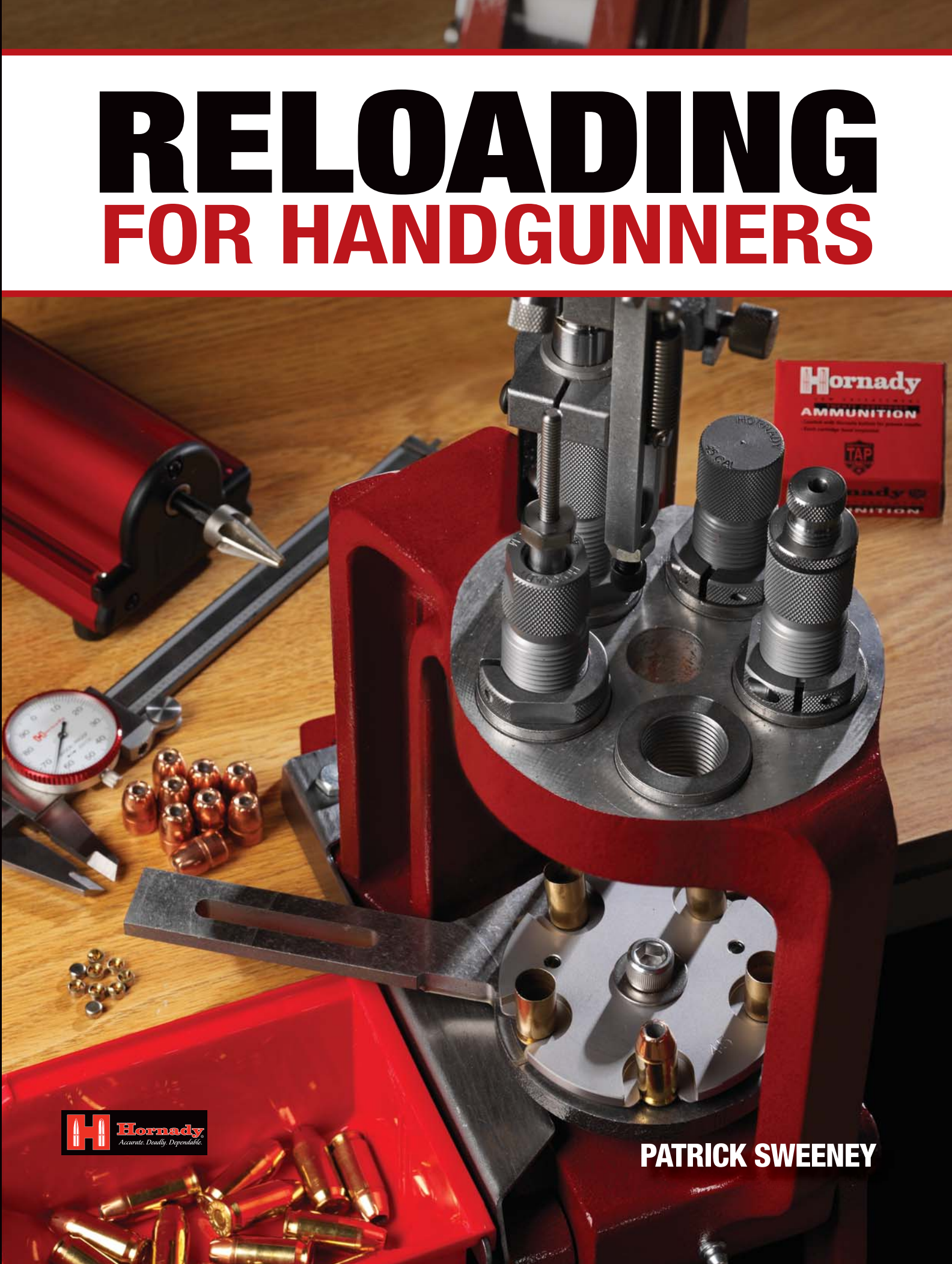
RELOADING
FOR HANDGUNNERS



PATRICK SWEENEY

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DEDICATION

For years, and books now, you have seen dedications to Felicia. This book is no exception. Without her life would be different – less fun, less traveled, less productive, and for you the readers, less, period. However, there is an addition.

Dan Shideler came on board as my editor for *Gun Digest Book of the AR-15, Volume 2*. With all due respect to those who labored with me before, Dan was easy to work with, fun to work with, and a veritable fountain of ideas and enthusiasm. For ten books we did our best to provide you, the reader, with information, entertainment, photos and something to look forward to on the bookshelves.

Alas, no more.

Dan left us in the Spring of 2011, too early.

So, for Felicia, who is still here, and for Dan, who isn't, safe reloading.

Patrick Sweeney
June 2011

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INTRODUCTION

Why reload? One might as well ask some of us, "Why shoot? Why compete? Why climb a mountain?" Because it is there.

But, existential questions aside, why reload is simple: control. If you wish to shoot and you depend on factory ammunition, you are dependent on: 1) what the ammo companies make; 2) what the store stocks; and 3) what your budget can afford. If any of those three do not fit your needs or desires, you will have a less pleasurable experience at the range. If two fail, you might well not be shooting at all.

One thing we have to get clear right away: you are not going to save money by reloading. Oh, don't get me wrong, you will recoup your capital investments (whatever they may be, over whatever period of time you spend) but you will not save money. You will not save any for the simple reason that, if you are like the rest of us, any potential savings will be plowed right into shooting more.

That is, if your "ouch" limit on shooting fun for the weekend is $100 of ammo, you will spend up to the point it begins to hurt. With factory ammo, that could be 100 rounds. With reloads, it could be 1,000 rounds. I ran into this same phenomenon when I was learning photography. Buying film in bulk, loading film canisters and doing my own developing didn't save money. It just meant a whole lot more practice, and practice is what makes you good. And that makes the expenditures worthwhile.

In addition to shooting more, reloading also allows you to shoot some firearms at all. There are firearms for which one cannot purchase ammunition, but for which ammunition can be loaded. Now, in many cases there is a good reason ammo isn't available; for one, many handguns should not be fired. And that includes rarities as well as elderly specimens.

This is not your typical reloading manual. What you have here is the collation of my personal experiences of decades of reloading. Some will be obvious, some will not.

I do not try to show some sort of loading data for every handgun cartridge in existence. For one thing, I haven't loaded them all. And another, I don't have them all. (Even in my circles there are calibers one just doesn't see.) What I cover are the ones I've done a whole passel of loading for, the ones I find interesting, and the ones that I hope you will find useful.

And for each, I include my lessons learned, the hints, tips and tricks I've found that keep them running. You see, while reloading is reloading, each cartridge can (and often does) have its own quirks, peculiarities and needs. Sort of like cars in that way.

And I also give you the lowdown on the reloading process. There are things you can do that will work to keep you out of trouble, and things that will make the work (if we can even call it that) a lot easier.

If you tend to your press – keep it clean, lube the working parts (and keep lubricant away from the primer feed system) – it will last a good, long time.

In the course of practicing, having fun, competing, teaching and being taught, and testing firearms as a gunsmith, I've shot over a million rounds. A large percentage of those were reloads. Properly done, reloaded ammunition can be as reliable, accurate and safe as factory-produced ammunition.

Take care of your press and take care in your reloading, and you too can reach the million-round mark.

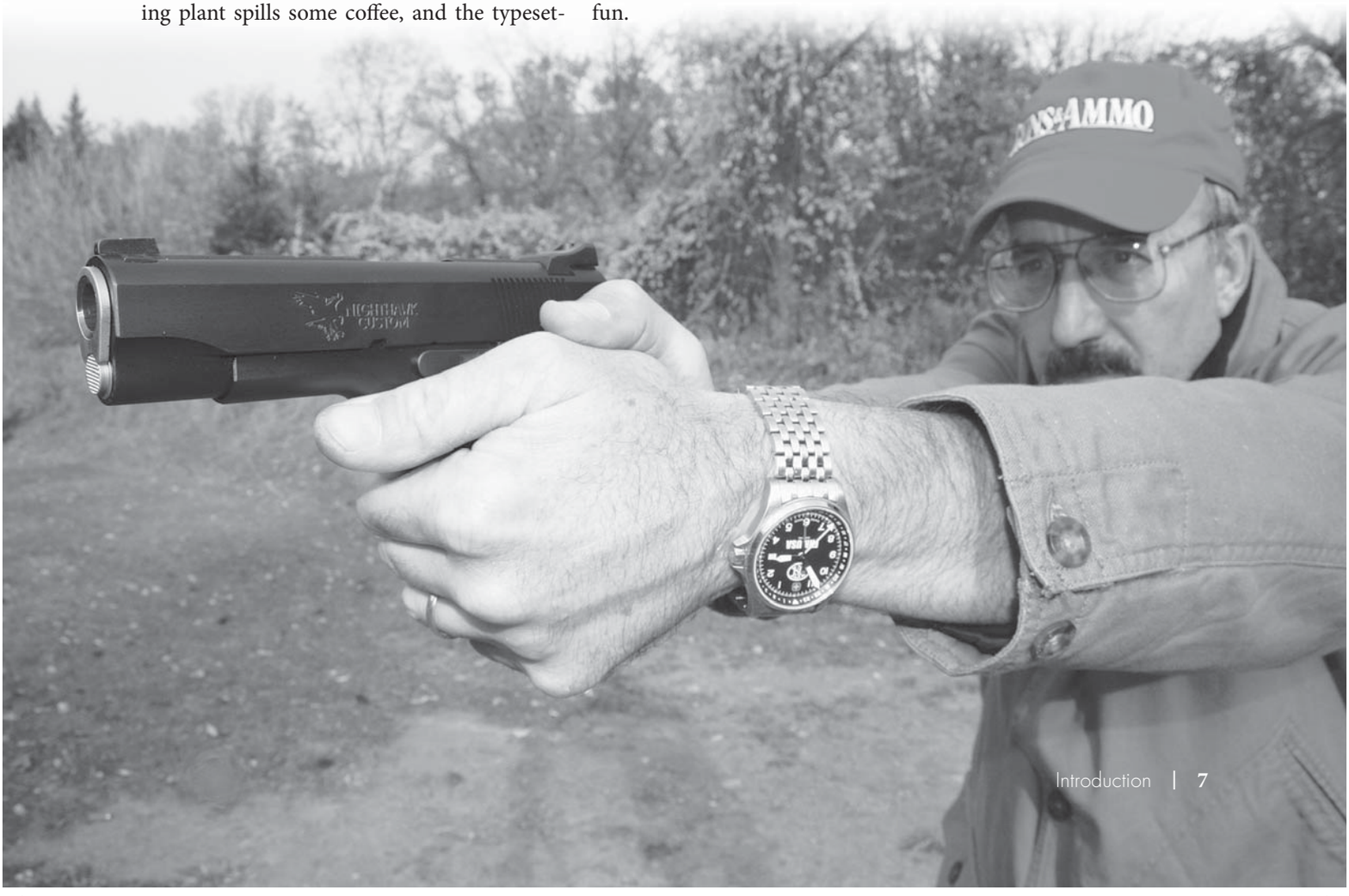
And, let's take a moment here to satisfy the lawyers, the cautious, and the 'sky is falling" crowd. These loads worked fine in my guns. I've checked them against industry data and the published information of the ammo and powder makers. I've done all I can to make sure they are ready for your enjoyment.

There are, however, things that are out of my control. For instance, if someone in the printing plant spills some coffee, and the typesetting software starts transposing numbers like a maniac, it wasn't me. Check my data yourself, against that published by others. If, for example, everyone else has published that a particular caliber/bullet/powder combo is maxed out at 5.8 grains, and for some reason my list shows it as 8.5 grains, it's that spilled coffee working mischief.

If your brother-in-law not only takes your prized SAA, and with his brand-new reamers opens the chambers up from .44 Special to something else, and proceeds to scatter bits of it across the range with his ammo, don't come looking to me.

We're all adults here, and doing something unsafe, unreasonable or just plain bone-headed gets you no sympathy from the rest of the shooting public.

Now that I've scared you off reloading, have fun.



Section I

Getting Started

Chapter One

WHAT YOU NEED

What you need is simple: empty brass of the correct caliber for your needs/firearms/gear, and appropriate bullets, powder and primers. Then, you need equipment to process that empty brass and stuff a suitable amount of powder between the bullet and primer.

Here is where the decision-making comes in. You see, reloading is exactly like automobiles in that you have choices. Once you have exceeded the basic threshold of function, it all comes down to "how fast do you want to go?" Which, translated, becomes "how much do you want to spend?"

A Yugo (provided it works at all) will get you someplace in pretty much the same time frame as a fully tricked-out Mercedes (we'll ignore the transit time in a Lamborghini, for the moment). It just does so at a different level of comfort, style, safety and reliability.

Reloading equipment of all levels can and will turn out entirely suitable ammunition, but some will do it faster, and some will do it for a longer period of time before needing a rebuild/overhaul.

One aspect of reloading for handguns that you should be aware of is volume. It is not unusual for a rifle reloader to sweat the details on a couple of boxes of brass and handcraft perfect little jewels of brass cases. When loaded, those 40 cases can last several hunting seasons. Benchrest shooters are even more extreme; they may sweat the details on 100 cases, winnowing down this or that near-microscopic "fault" until they have twenty hand-crafted, identical in every aspect that can be measured, perfect cases.

You must have a scale, even though you won't be weighing each and every powder charge you drop.

Handgun shooters, however, tend towards volume. As in a couple of hundred rounds in a weekend's practice session. Even just plinking, it is easy to go through that much. If you're shooting in competition and trying to improve your skill, that every weekend is the minimum norm. 200 rounds a weekend, every weekend, is only 10,000 rounds a year. In a lot of competition circles, that is barely enough to keep your skills level and not slipping back. It is not unusual for those wishing to move up in the world to shoot 20, 30 and even 40 thousand rounds in a year's practice session, and extra ammo in regular matches. Those striving to reach the pinnacle of practical shooting may consume on the order of 75,000 rounds a year for a couple of years in their quest for Grand Master and National Champion status.

So, you have to balance capital investment against production capacity, keeping in mind just how much time you will have to shoot. Now, volume production does not always mean you are planning to be awash in ammo. You see, with a bit of practice and proper notes, you can produce ammo quickly, even if you do need buckets of it.

Not to jump ahead, but let's take for example

a single-stage press and a progressive press. The single stage press will have a final production rate of perhaps 50 rounds per hour. For the rifle loader, that means he's spending an hour a week in the basement (many reloading locations are in the basement) and have an embarrassment of ammo, ending the year with 250 rounds. (I've known successful hunters who have not fired 250 rounds in decades of hunting.) However, a single stage press used to load your 200 rounds of handgun practice ammo means not less than four hours down there during the week. If your wife (or husband) is happy with that, fine. If not, then a progressive press will produce that much ammunition in less than one hour.

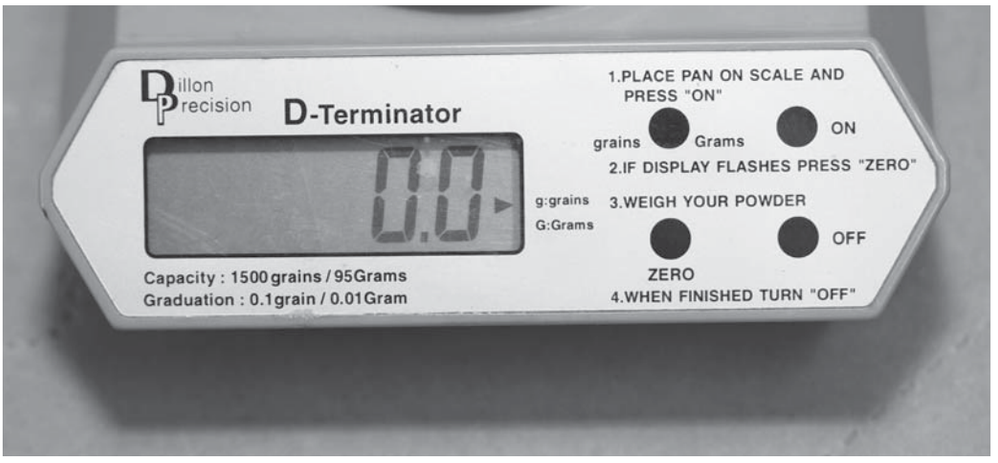
With the progressive press, you'll spend the time of one TV show that he/she likes and you don't, loading ammo. You spend a bit of money and find the time, and thus preserve domestic bliss.

So, when you consider equipment, consider not just what it does but how quickly it does it, and what effect that will have on your total throughput.

The minimum equipment you're going to need falls into the following categories:

- Brass prep, to make sure your brass is clean and ready to load.
- Loading gear, to mash all the various parts together. This will include the measuring tools you'll use.
- Component storage, because you can't just let all the ingredients spill across the floor.
- Recordkeeping, because if you load more than one load in one caliber, you have to keep track of it all. Failure to do so in an efficient manner can lead to more than embarrassment, it can lead to busted guns and/or shooters.
- And finally, a place to do all this. Ideally, a dedicated space, one that can be secured against prying eyes and busy hands.

You may be tempted to scrimp on gear, to "make do" with a compromise or a something of lesser quality. I don't want to give the impression that I'm solely advocating the purchase of gold-plated equipment, but keep this in mind: you'll most likely be the one holding the firearm that will be firing the ammo you loaded.

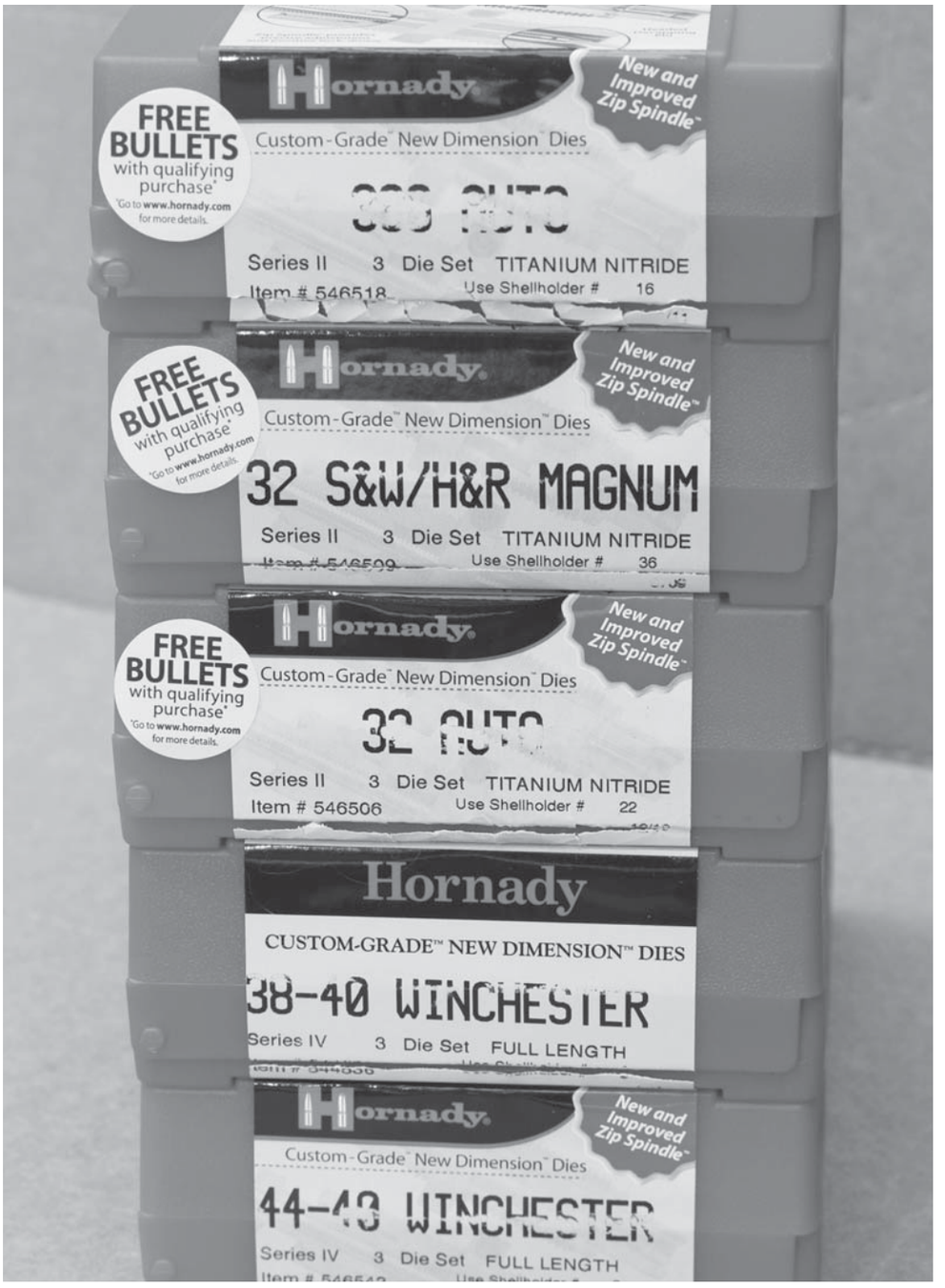


The controls on any scale are clear. Pay attention to what it is telling you.

LOADING ROOM

Archimedes famously said, "Give me a place to stand, and a lever long enough, and I can move the earth." When it comes to loading, you can be too comfortable, but only because the room or its contents distract you.

Clean, warm, dry and well-lit is a good place to start. And since you'll need a place to load, we'll cover this before the actual gear or loading.



I must confess a fondness for Hornady dies.

Benches

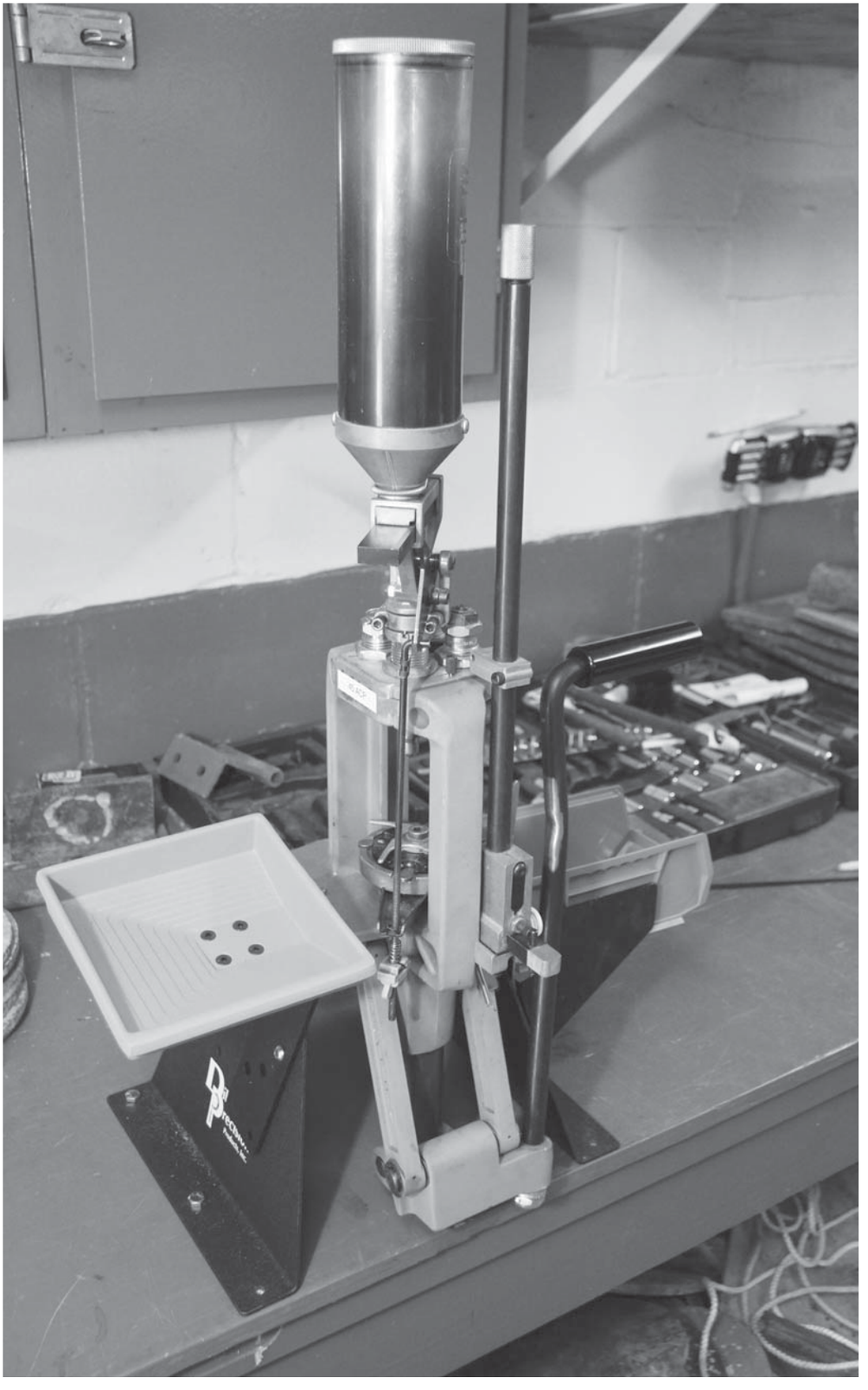
Benches, as many as you can fit, should be at a good working height and secured either by mass or by being bolted to the wall. You'll be working a lever that will be squeezing brass, so you need mass or bolts to keep from ending up with a bench that "walks" its way around the room as you load on it. Some of us load sitting, some load standing, and the bench height will have to be correct for you. If you have never worked at a workbench, get out and get some practice. Offer to pull the handle on a friend's loading press to see what height works for you. I could offer elaborate measurements, based on OSHA standards for ergonomic compliance, but in the end you'll have to figure it out for yourself.

The benches should not be full-sized tables or other such furniture. I have found that any benchtop more than two feet deep simply collects "gear drifts" at the back. By keeping the bench relatively shallow, you have to put stuff away. Now, if you are not prone to the gear-drift phenomenon, then fine, make them the way you want them. But for me, no more than two feet deep, and I have some that are even less.

Ideally, you will have a "loading bench" that

If you have a press (and how can you reload without one?) you must stock spare parts for the items easily lost, bent or worn.

Reloading allows you to not only do alot more shooting for the money you spend, but also to tune your ammo for your handgun and the matches you shoot.



A progressive, like this Dillon 550B, will produce a lot of ammo for a long time.

holds only your loading press and the components of the session. Less ideal is a bench that holds a press and, say, a vise, drill press or other non-loading gear. With a dedicated bench, you can keep things clean and sorted out.

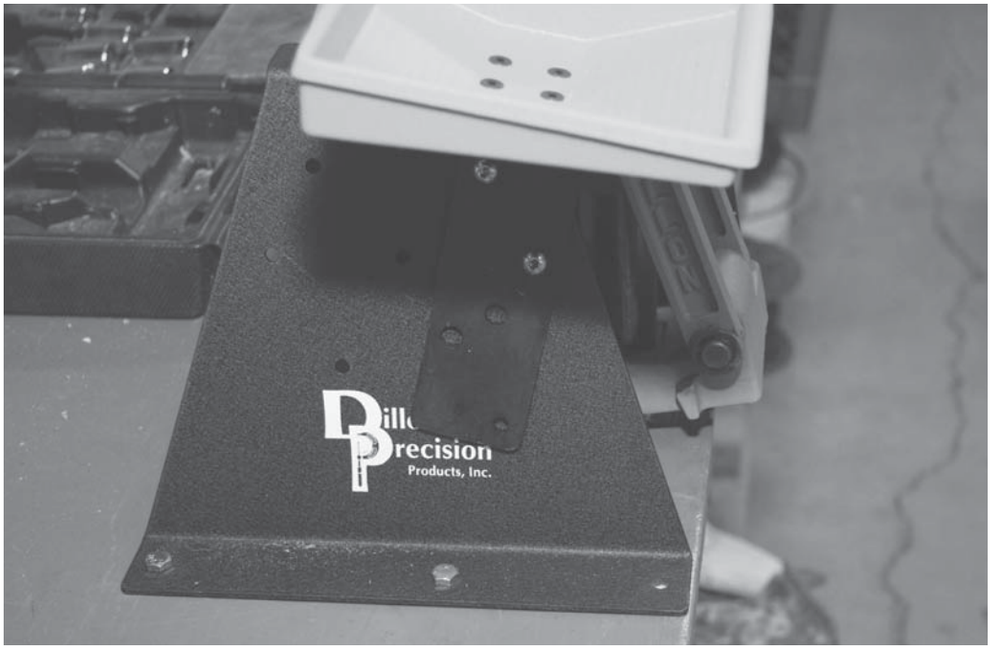
Now comes the important part; the loading bench should have all the bullets you own on the lower shelves, and nothing else stored there. No powder, no primers, no brass. The powders, primers and brass should be stored on other shelves or benches across the room. The idea is to make it a conscious effort to re-supply powder or primers. That way, you are very much less likely to make a mistake. If your powders are right there, within arm's reach, you'll be tempted to grab the next bottle of whatever while you continue to do whatever it is you are doing. That is a great way to grab the wrong powder (if you have more than one on hand) and end up loading with the wrong powder.

When it comes time to refresh your powder measure, you use the bottle/canister on the bench, the one you've been using all along. If you run out, you have to walk over, look at the shelves, and grab another of the same kind (ideally, one from the same production lot).

Also, do not keep a supply of primers on the bench. When it comes time to reload primers, you have to walk over and get more. The walking is good. You have been loading, either sitting down or standing in the same spot. It is a good thing to move now and then to keep from getting tired.

Lighting

Nothing makes reloading more miserable than a gloomy place to load. Loading by the light of a single, 60-watt bulb (and it is always in the wrong location) is asking for trouble. I did it for years and hated it. When I had the chance I installed banks of fluorescent lights to flood the new, white-painted room with light.



If you stand to load, then the Dillon strong mount makes the press more rigid and puts it higher.

The Redding GRx die sizes your Glock brass, one at a time.

Glocks are hard on brass, especially in 40. These have been bulged from being fired in a Glock.

Ventilation

A musty, damp or moldy location is not just bad for your dies and tools, it is bad for you. Scrub the place clean, dry it, paint it and keep it dry. I have a dehumidifier running in my loading space, and keep it down at 50 percent relative humidity 24/7.

Quiet

You can have a radio going if the music is background music and not distracting. No TV, no videos, no DVDs of something else running to catch your eye and distract you.

No smoking. Not only is smoking bad for you, but there is a lot of flammable stuff you'll be dealing with.

No food, either, to preclude lead ingestion.

When you load, start with a clean and spartan bench and loading press. Then, bring only the components to the bench that you need for that caliber and load. Nothing else. Load until you are done, then put the components back, empty the powder measure and put things away.

A little effort at the beginning to keep things neat will keep you out of trouble for a long time, perhaps forever.

BRASS PREP

Sorting

Unless you are buying your brass new and unfired, it will have to be cleaned. Brass picked up at the range (if the range allows it, some do not allow "brass mining," you can pick up only what you shoot) will have powder residue and dirt/sand/mud/whatever on it. You must clean the brass or your loading dies will suffer heinously from the dirt. So, first things first: sort.

Sort by caliber and by cleanliness. The various calibers should go into whatever containers you use – cardboard boxes, plastic bins, used tofu containers, whatever works. Your brass will be grubby, so the containers will get grubby.

You can pluck each empty off the die if you wish. Not efficient.

Also sort by cleanliness. At the top will be brass that fell onto dry, clean soil or grass. No need for extra work. Next is the muddy stuff, and last is the chocolate-colored brass.

The top brass goes right to the next cleaning step – into the tumbler. The other stuff needs some attention. The muddy brass is easy; drop them into a bucket (wait until you have enough to warrant the effort) of water as hot as you can get it from the tap and some dishwashing soap. Stir it with a paint stirrer or similar tool until the brass does not have caked mud clinging to it, then decant the soapy water into the laundry sink (filter, to avoid brass in the drain trap) and rinse with hot water right from the tap into the bucket. Decant again and then spread the brass on an old bath towel in direct sunlight. Leave there until dry. Do not be impatient, or clinging moisture will spoil your fun later.

The chocolate brass is oxidized and requires chemical cleaners. Birchwood Casey makes a chemical cleaner, and I find my supply of "chocolate" brass is so small that using it once a year or so is all I need. I mix it twice as strong as the directions call for and soak

Brass cleaning is most often the bottleneck that slows down loading.

the brass twice as long. I then decant, and treat the brass to the same hot-water process as above. Indeed, you can, if you stockpile enough brass in a caliber, make it an annual mud-and-oxide cleaning session.

You can also use a power cleaner. Hornady makes a couple of powered cleaners. They use chemical solutions and heat to accelerate the cleaning process. Depending on your range conditions, you may find that power and chemicals works better than just sorting and a tumbler.

Cleaning

On to the tumbler. Curiously, even cleaners that vibrate and swirl the brass are called "tumblers." Basically, you pour dry and ready-to-be-cleaned brass into the bowl, add a cleaning medium and some polisher (some people skip the polishing goo) and then seal and turn on. The vibrating/swirling action rubs the media against the brass, scrubbing off the dirt. The polish scuffs the oxidized layer of brass off, leaving you with brass gleaming as if it were new.

How big a tumbler should you get? As big as you can afford and have bench room for. This is not the place to economize, as brass cleaning is most often the bottleneck that slows down loading. When I started reloading, I had a tumbler (that actually tumbled) and it cleaned 200 empties in two hours. It was just too bad that I could load 200 rounds in about 35 minutes. I was running that tumbler day and night, even when I wasn't loading, just to keep me in clean brass. Something like the Dillon 2000 (and you know how they named it) will clean brass in two hours, but at the end you have up to 2,000 clean, empty handgun cases.

The tumbler usually takes ground corncobs or walnut hulls, but I have heard of people using rice. It just goes against my grain to use a food product to clean brass, so I've never tried it, but there are those who swear by it.

The polish is easy; just dump a capful or so into the mix before you start it up, and your brass will be cleaner.

While we're here, let's take a moment to discuss lead. It will be in many of the components you'll be using. It is the densest common metal, and on the periodic table it is noted with the symbol Pb from the Latin *plumbum*.

Some will tell you lead is evil, and nearly as lethal as plutonium. No. One of the first things we learn in chem lab (and, apparently, med school) is the old adage "dose makes the poison." Lead, being a metal, washes off. It is not absorbed "through the pores of your skin" and it certainly (as I was solemnly assured by an FBI agent) does not pass through your skin and directly into your brain if you used your hat to collect brass at the range.

You get lead into your body in the simplest and most prosaic way by ingesting it, usually from your hands or food/drink. Or you inhale it from fired powder smoke or on the cigarette you smoked at the indoor range. The bullets you handle and the brass you are cleaning will probably have lead on or in them. So, don't eat while you load, don't suck your fingers while you load, and after you wipe the tumbler clean, wash your hands. Smoking? Smoking is verboten for this, as well as, another reason; you'll have powder and primers close at hand, and a burning anything is contraindicated while reloading.

Once you've cleaned your brass, place it in clean containers, not the same boxes the ammo came from, that is not at all useful. You're going to be loading hundreds of rounds. You do not want to be individually placing fifty empties at a time in a box. The only reason to save the box is if you plan on flying to a match, and then you'll need "factory ammunition boxes" in which to schlep your ammo in your checked luggage.

RELOADING PRESS

Presses come in two flavors: single-stage or progressive. Each have variants, but for the moment we'll consider those two. The single-stage press only holds one loading die (the cylindrical tool that performs some operation in the loading stream) at a time. So, to size all your cases, you screw the sizing die in, and pull the handle down-and-up once for each and every one of them. You then unscrew that die, screw in the next one, and continue.

With a unit like this, to reload a single

Police departments do not reload, if you have an "in" you can quickly acquire a lifetime supply of brass.

If you shoot Glocks, or your buddies do and you often end up with their brass, get this die.

Redding makes a storage bottle, to catch your .40 brass once it has gone through the GRx die.

round requires that you pull the handle (down and up) on a single-stage press five to seven times, depending on just how many steps you can double-up in dies. For instance, the sizing die can also de-cap, that is, press out the expended primer, and seat the primer in one step. So, 100 rounds means 500-700 handle cycles.

A progressive arranges a full set of dies in either a circular or straight-line array, and each time you pull the handle you process and then move all of them one step. Each die performs its operation, and once the press is fully loaded, you produce a loaded round with each pull of the handle. Some progressives require that you move the rounds between handle pulls, and some (known as auto-indexing) automatically move the array at the beginning or end of each handle stroke. Start to finish, loading 100 rounds requires 105 to 110 handle cycles.

Here I'll deviate from the orthodoxy, and suggest that you start out with a single-stage, and then buy a progressive once you know how reloading works. That might happen quickly, in a few weeks. It might take longer, even a couple of years. The idea is simple; with a single-stage press you learn each step by itself. Then when you are comfortable, you put them all together in the progressive. Advocates of each will tell you (and for various reasons) that you do not need the other. Me, I figure that the single-stage press doesn't go bad on the shelf, and can be used for other purposes later on.

DIES

First things first. Do not succumb to the "savings" of buying uncoated, steel dies. Get either carbide dies (they have carbide insert or inserts in the wear areas) or titanium nitride-coated dies. Hardened steel dies require lubrication, or you will get a case stuck in them. Lube is messy and can add problems of its own. If, and only if, the caliber you absolutely have to load is not available in either carbine or TiN, consider a plain steel die. And then think about it seriously. That would be one use of your previously "unused" single-stage die. Use it to size and de-prime your clean and lubed brass. Then re-clean the lube off, and feed the prepped brass into your progressive to load it.

Once you have carbide or TiN, then we work from there.

Sizing

The die squeezes the brass back down to proper size after having been fired. Depending how much pressure the load used generated, sizing can be easy or difficult. For instance, a .38 Special, using PPC-level loads

Depending on the type of match, your handgun may need ammo with more or less power. Reloading allows you to choose.

The feature of a progressive press that makes it a progressive is the rotating shell plate. Not many presses are straight-line any more.

(the classic 148 grain wadcutter and 2.7 grains of Bullseye) will require little effort to re-size. A .44 Magnum load, meant for hunting, with a 290 grain bullet and a case full of slow-burning powder, fired in a Ruger Super Blackhawk (because it would be very hard on the gun, or even break it, to shoot such a load in an S&W M29) will almost require that you stand on the handle to re-size the case, which should be a clue. A case so-hammered is not going to last as long as the one we used in the .38 Special example.

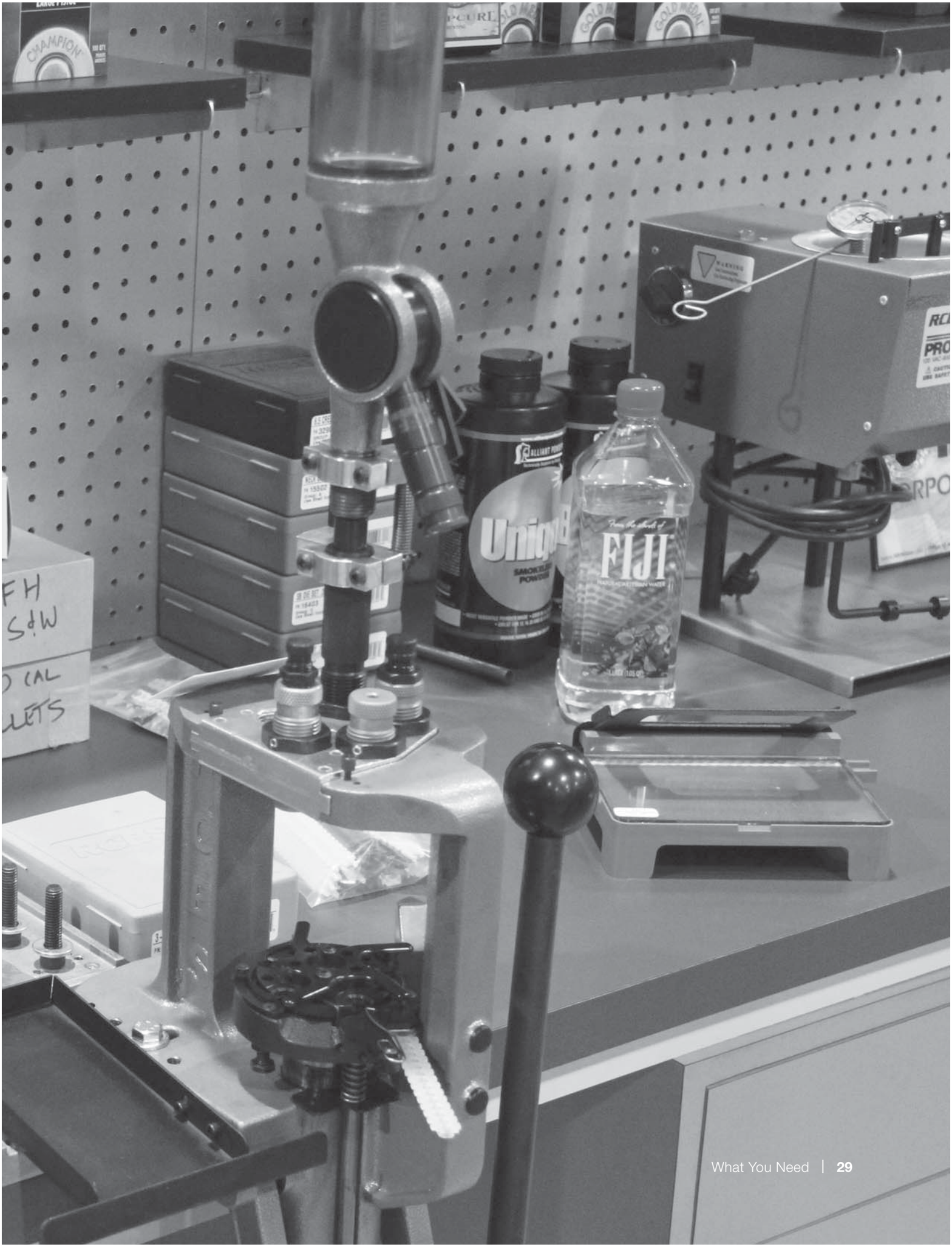
Most die sets are arranged so the sizing die also de-primes. That is, it presses out the fired primer, making it possible to insert a new one. All you have to keep an eye out for are berdan cases (they don't have central vent hole, and thus can't be de-primed by your die) and crimped-in primers. The military insists on crimped primers so an over-pressure round won't blow the primer out, and the lost primer tie up the weapon at an inopportune moment. (And when someone is shooting at you, almost any moment is an inopportune one for that.)

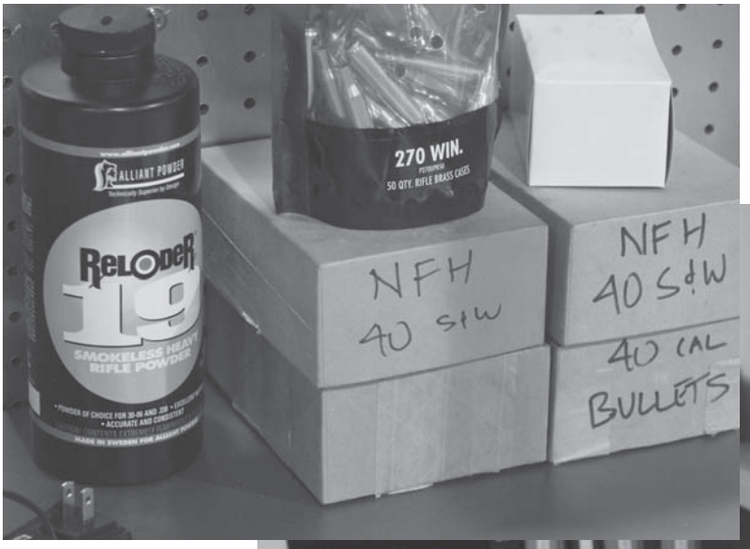
If you are loading heavy loads in the .44, it might be a good idea to not only use carbide dies in your single-stage press for sizing, but apply a bit of lube, too. Something like Hornady One Shot is easy to apply, easy to remove and will make your sizing operation a whole lot less like manual labor.

Belling

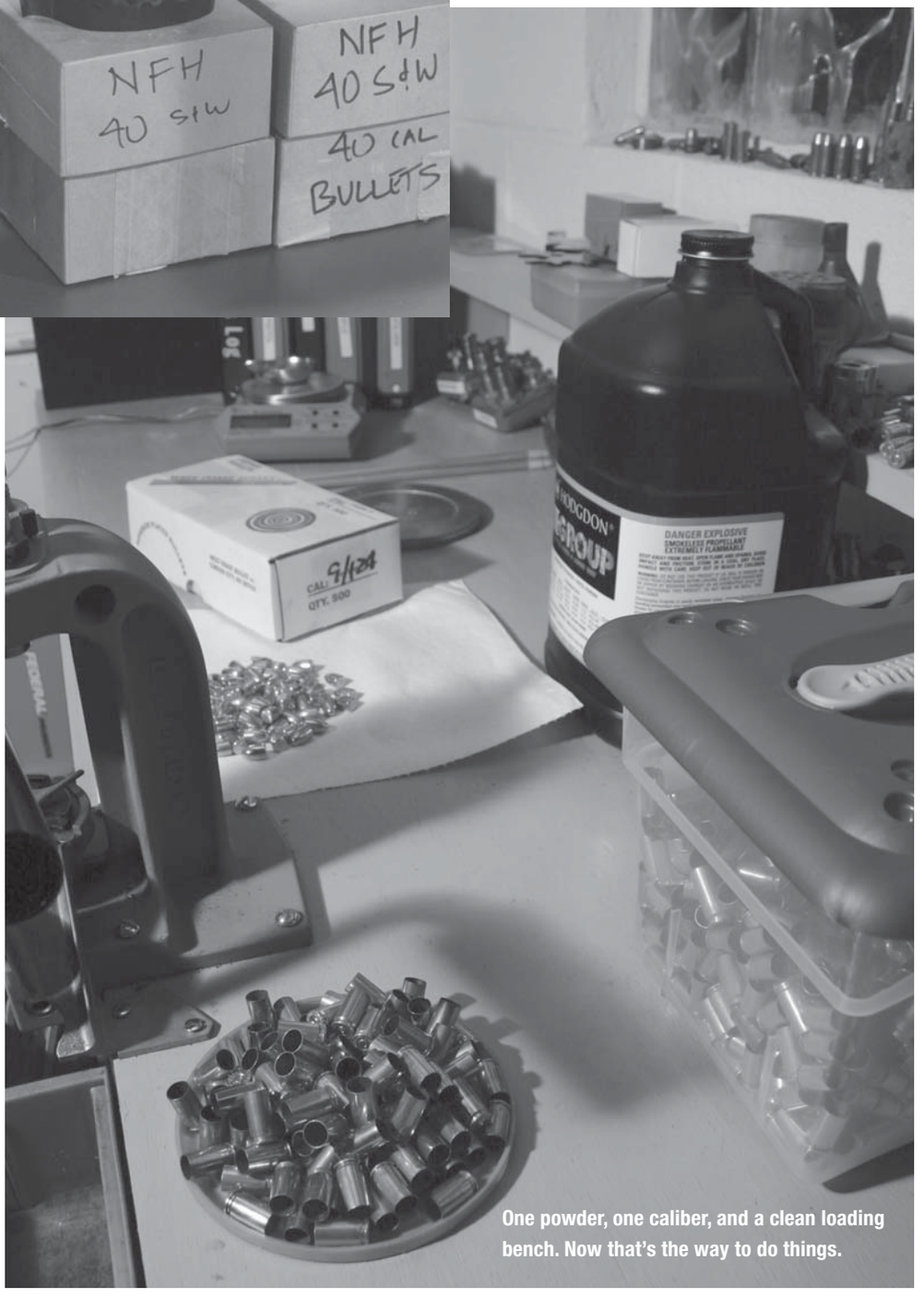
To get bullets seated without a fuss, you have to bell the case mouth. Some die sets do this as a separate operation, many progressives do it as the powder-dropping step. Belling is a caliber- and bullet-dependant setting. If you are loading bevel-based jacketed bul-

Your reloading bench should be kept clean. And, against my advice, this bench has more than one kind of powder on it. Tsk, tsk.





Clearly mark your storage containers. Nothing makes finding the next batch of brass more of a hassle than having to open each container and peer in, just to see what's in there.



One powder, one caliber, and a clean loading bench. Now that's the way to do things.

lets, you can get by with a small amount of belling. If you are loading hollow-base wadcutters, you're going to have to bell the cases a lot more.

Seating

You want bullets seated straight, square and consistently. Avoid, if at all possible, dies that both seat and then crimp.

Crimping

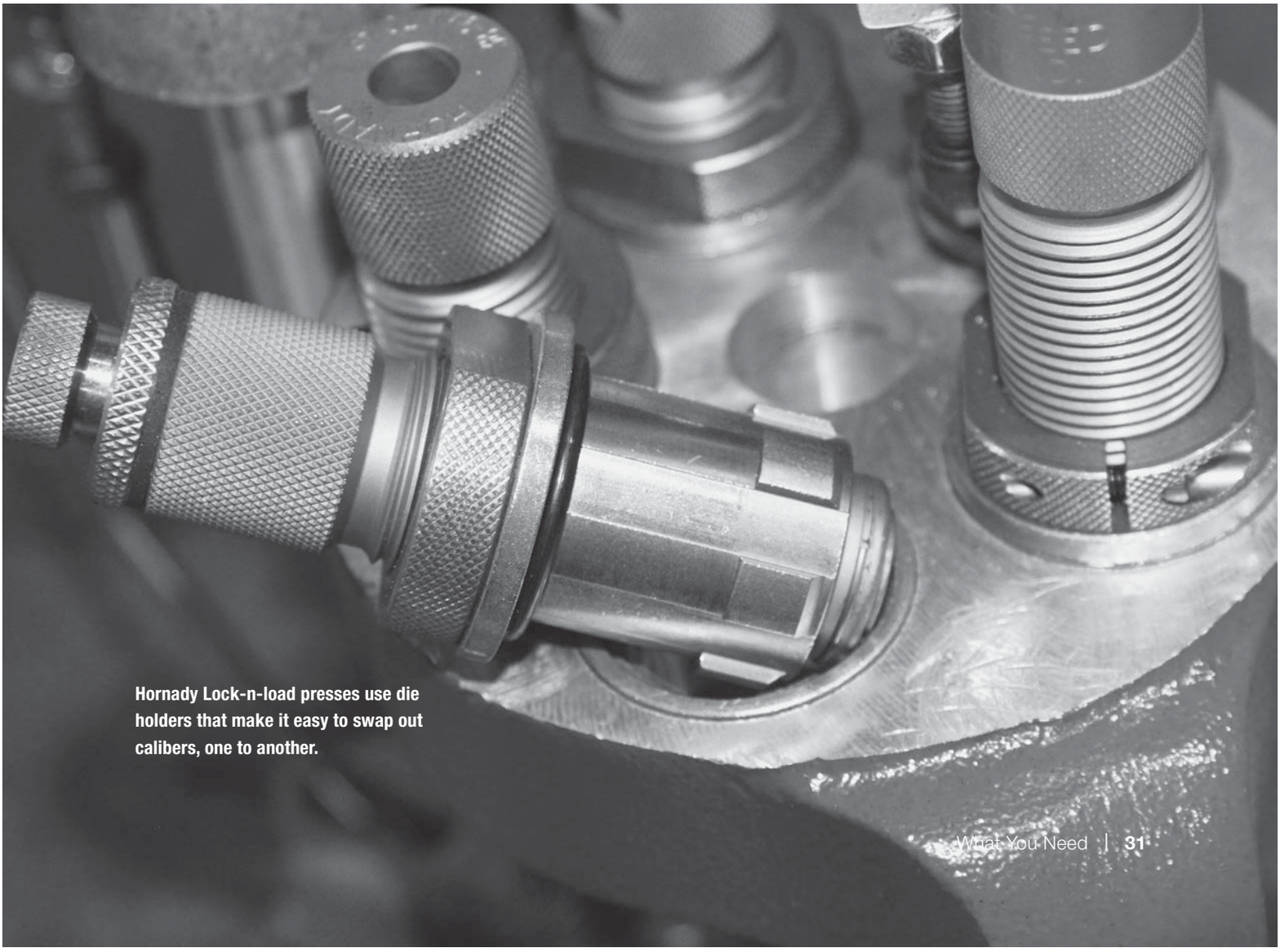
The belling you did a step before? You have to remove that. And, in some loads, you have to crimp the case mouth in good and tight to provide enough resistance to ensure complete powder combustion.

EXTRAS, BUT NEEDED

Some people think that having those dies is enough. Actually, you'll need more to do a good job.

Powder scale

Some kind of scale to weigh powder is a must. Not because you're going to weigh each and every powder charge. (That is not even the case with some rifle-caliber re-loaders.) No, you need it to make sure the powder dispenser you are using is actually dropping the powder charge you expect it to. Zero your scale, and at the start of your loading check the powder drop weight. Is it correct? Great.



Hornady Lock-n-load presses use die holders that make it easy to swap out calibers, one to another.

Bullet and case trays speed things up. They are easy, inexpensive and no-maintenance. Bullet and case feeders speed things up even more, but they have a lot of maintenance and setup required.

If it isn't, find out why. The measure may be mis-set, you may have grabbed the wrong powder off the shelf, you may be looking at the wrong page or bullet weight in the loading manual.

Dial calipers

Good digital calipers are now so inexpensive that you cannot claim poverty to avoid owning one or two. Calipers let you check loaded over-all length, crimp diameter and bullet diameter, and you simply must own a set. Digital is best, and while you're at it, get spare batteries for it. Nothing makes a loading session more pointless than waiting until the last minute and then finding out your calipers are dead, and you have to start the process by buying batteries. If you are loading at 10:30 p.m. on a Friday night for the weekend's match, good luck finding the batteries you need.

Case gauge

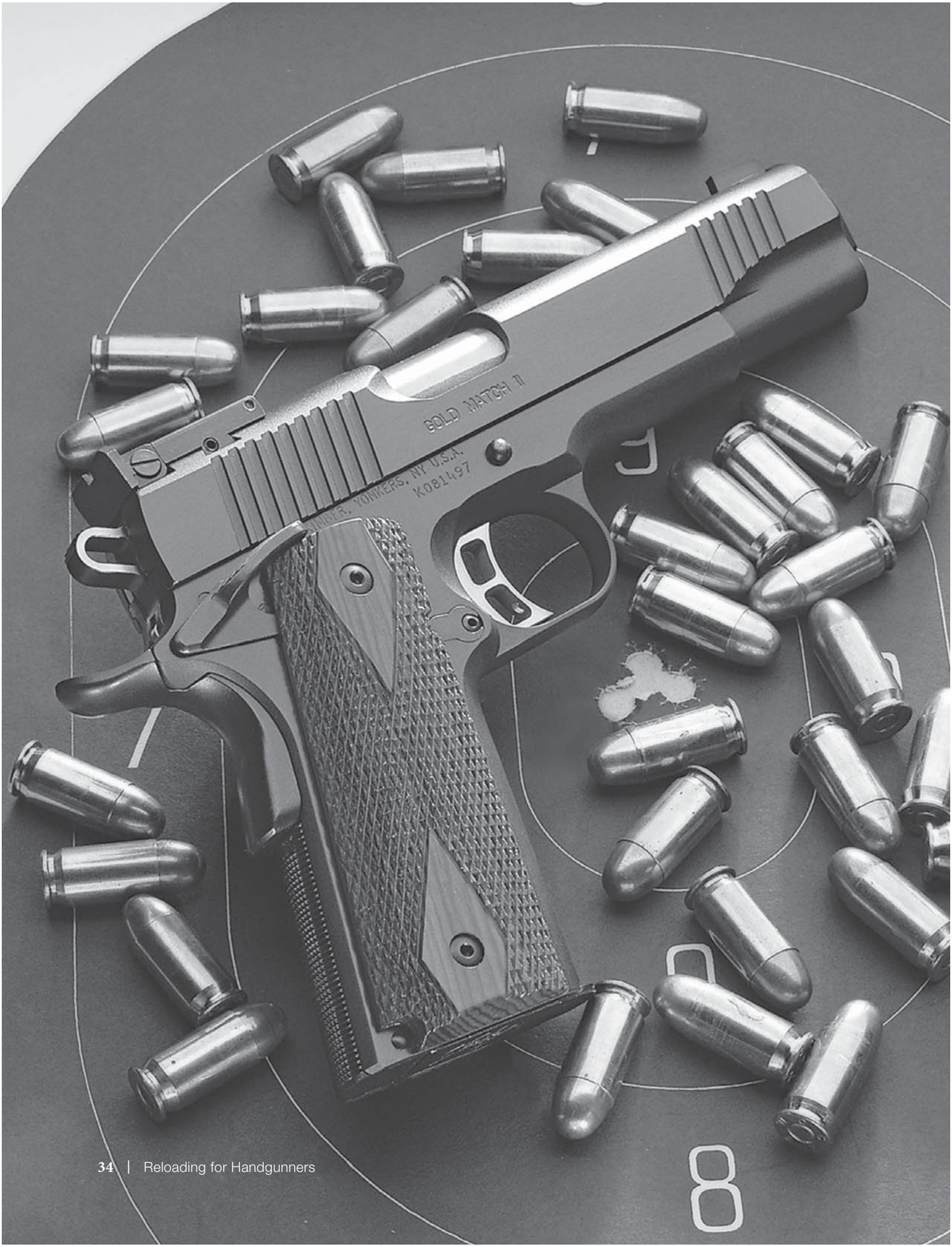
While they are called case gauges, most of us use them as loaded-ammo gauges. The idea is simple; the case gauge is a chamber reamed, to the absolute minimum dimensions allowed by the blueprints, into a plain steel cylinder. You also use it to set up your sizing die; size your first piece of brass and drop it in to ensure things are copacetic. But most of us use it for loaded ammo, too, and either gauge-check one round in ten or twenty, or just sit there in front of the TV, late at night, gauge-checking every single one of them. (Well, as bachelors, we do, or did. Now that we're settled down, and have a better handle on the loading process, we just spot-check ammo.)

LABELING, STORING AND RECORDKEEPING

Loaded ammo has to be labeled and stored. Getting things mixed up will not just ruin a days plinking or scratch your match entry in a competition, but could lead to busted guns

and injured shooters. Once loaded, ammo should be stored in clean, sealed containers and labeled. What containers you use, and what labeling system works for you, is up to you. And as I said earlier, if you load more than one load in one caliber, keep track of it all with a recordkeeping system to avoid problems. I have some guidelines, but if mine don't work for you, compose your own. Just do it.

A scale is so important that having a storage case for it is not a bad idea.



Chapter Two:

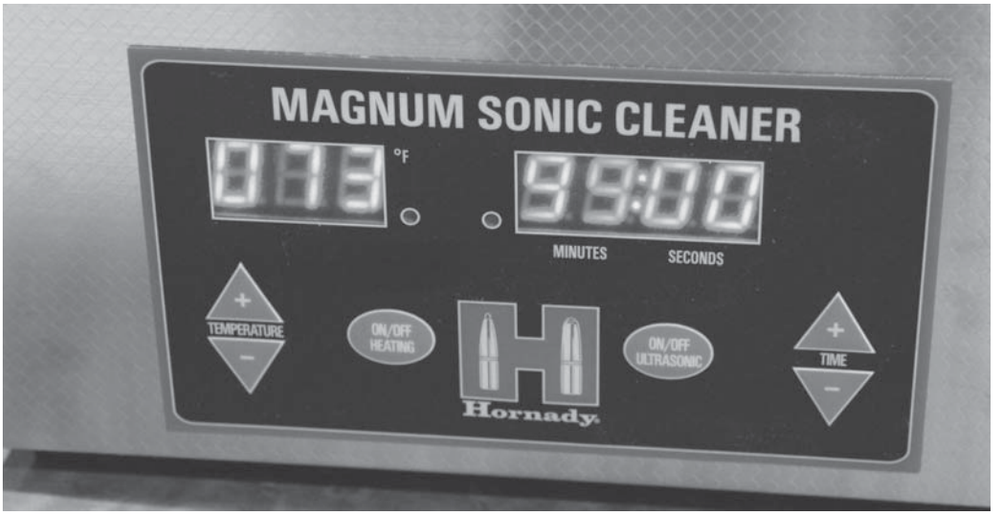
BRASS

WHICH BRASS?

Brass is brass, right? Not at all. There are some brands of brass that will not only make your life miserable, but complicated. And, some treatments the manufacturers subject brass to will make you cry. The big one is crimped primer pockets. Basically, once the primer has been seated in the manufacturing process, the manufacturer stamps around the rim of the pocket, kicking up a ledge that locks the primer in place. Your decapping die will probably press the primer out (but not always) but when you go to seat the next primer, things will come to a crashing halt. Sometimes the decapping pin will press it out, but the old primer is "speared" onto the decapping pin, and gets pulled back to the case. Things get stuck, you get out of sequence, and it takes a minute or two to disassemble the press, solve the problem and get back to work.

Once the primer is out, you can swage or cut the crimp. In the early days, I'd read of writers who suggested that a common pocketknife could be used to cut the crimp. They were sadists, or were not dealing in any kind of volume whatsoever. When I was really into volume loading, some friends and I built a contraption that locked a case deburring tool into a power drill, and affixed a shield over it. The whole thing was basically an electrical motor in a box, and you worked it by sitting down in a comfy chair, nestling the gizmo in your lap, and pressing the primer pockets of deprimed cases against it. You used the nose end of the cutter to power-ream crimps off at the rate of 30-40 a minute. But, the thing was

Brass cleaning can be quick and automated. The Hornady power cleaner makes them shiny.



The Hornady Sonic Cleaner allows you to set time and temperature.

so loud, at several thousand rpm, that you had to wear eye and hearing protection. The Dillon 1050 press has a station for swaging crimped primer pockets, but if you don't load on one, you don't have this option. (We did it because we couldn't wrestle whatever brass it was into the 1050, I forget which. Probably .308.) For most of you, sorting the crimped brass out to be batch-processed later is the only option.

Does mixing brands matter? Sometimes. If you are loading right to the limit, yes. In that instance you want all your brass to be the same. If you desire the absolute highest ac-

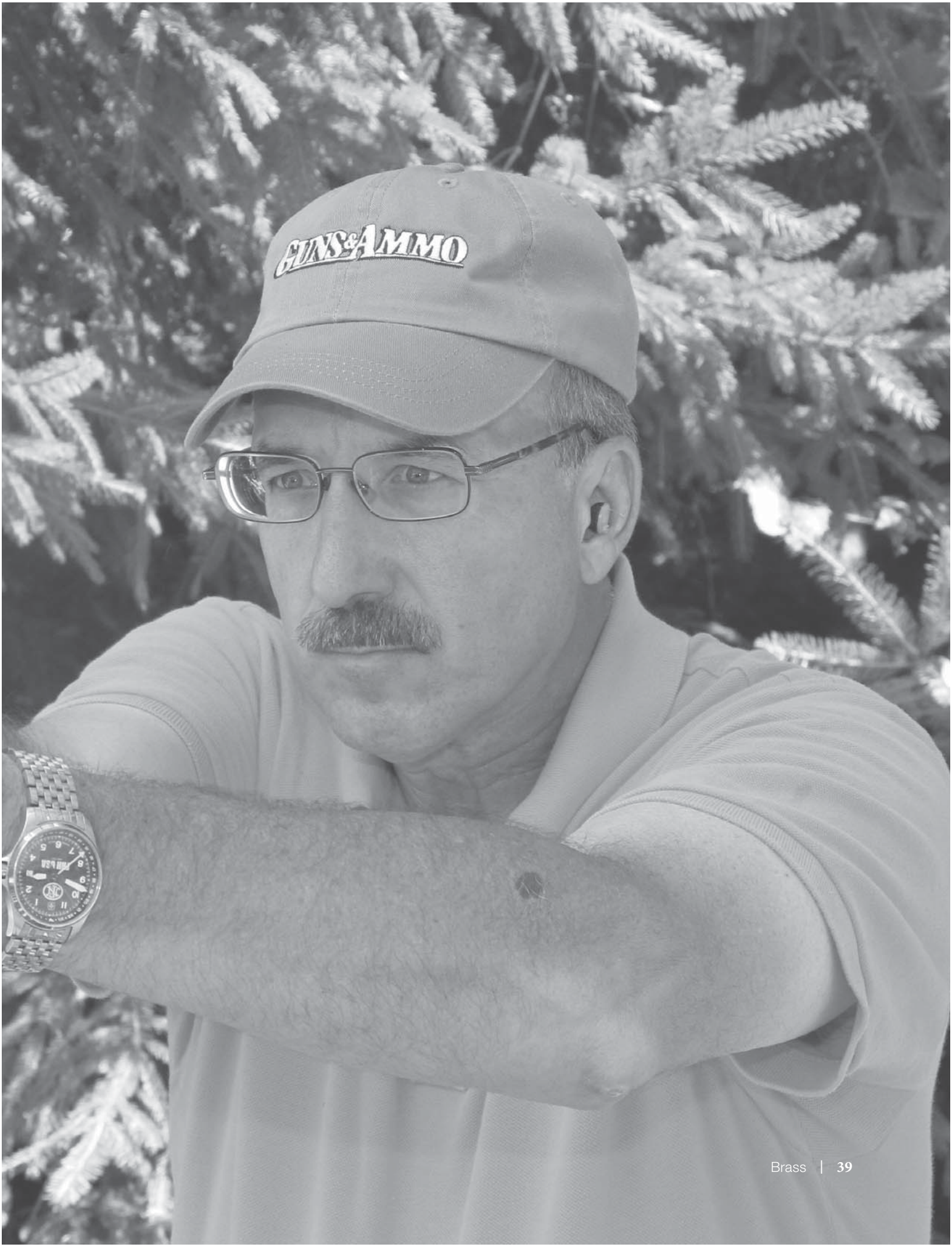
curacy, you'd be well-served to use just one batch of one brand, and that would be the one your gun tells you it prefers. If you are loading to the maximum safe pressure, yes, you want to be using all the same brass.

If you are not doing any of those, then whatever you pick up, find at your gun club, shoot and save, will be useful. Now, there will be "brass" you won't want. All the steel and aluminum stuff, toss in the trash. If you are scrounging up a motherlode of empties at the gun club (and your club allows it), look at the headstamps as you start grabbing. If it doesn't look familiar, turn the cases around and look inside. If it is Berdan-primed, ditch it. Boxer-primed brass has a central flash hole, and your decapping pin will punch the old primers out. Berdan-primed brass has two or three holes, off-center, and cannot be reloaded. Well, at least not with the common tools you'll be able to acquire. Given the price of scrap brass on the metals market, it might be worth picking it up anyway, but not for reloading.

Other than specialized needs, you don't have to do much sorting. One that I do sort is the Remington (or R–P headstamped) brass out of my .38 and .357 bins. One of my re-

The Hornady Ultrasonic cleaner buzzes through dirty brass.

Nothing like a dollop of slow-burning powder in a .357 mag snubbie to liven up a plinking session, eh?



Once your brass is clean, you should store it in a way that will keep it clean. Closed, clear plastic boxes work well.

volvers uses full-moon clips (yes, in .38/.357) but it only works with Remington brass. The other brass doesn't have enough of an undercut in front of the rim to accept the moonclip. So, R-P for the ICORE guns, and everything else for all the others.

Other than that, you can easily find out what the "crap-du-jour" brass of your caliber is by doing a quick internet search. The list changes regularly, and anything I put down here will be out of date by the time you read it.

CLEAN & INSPECT

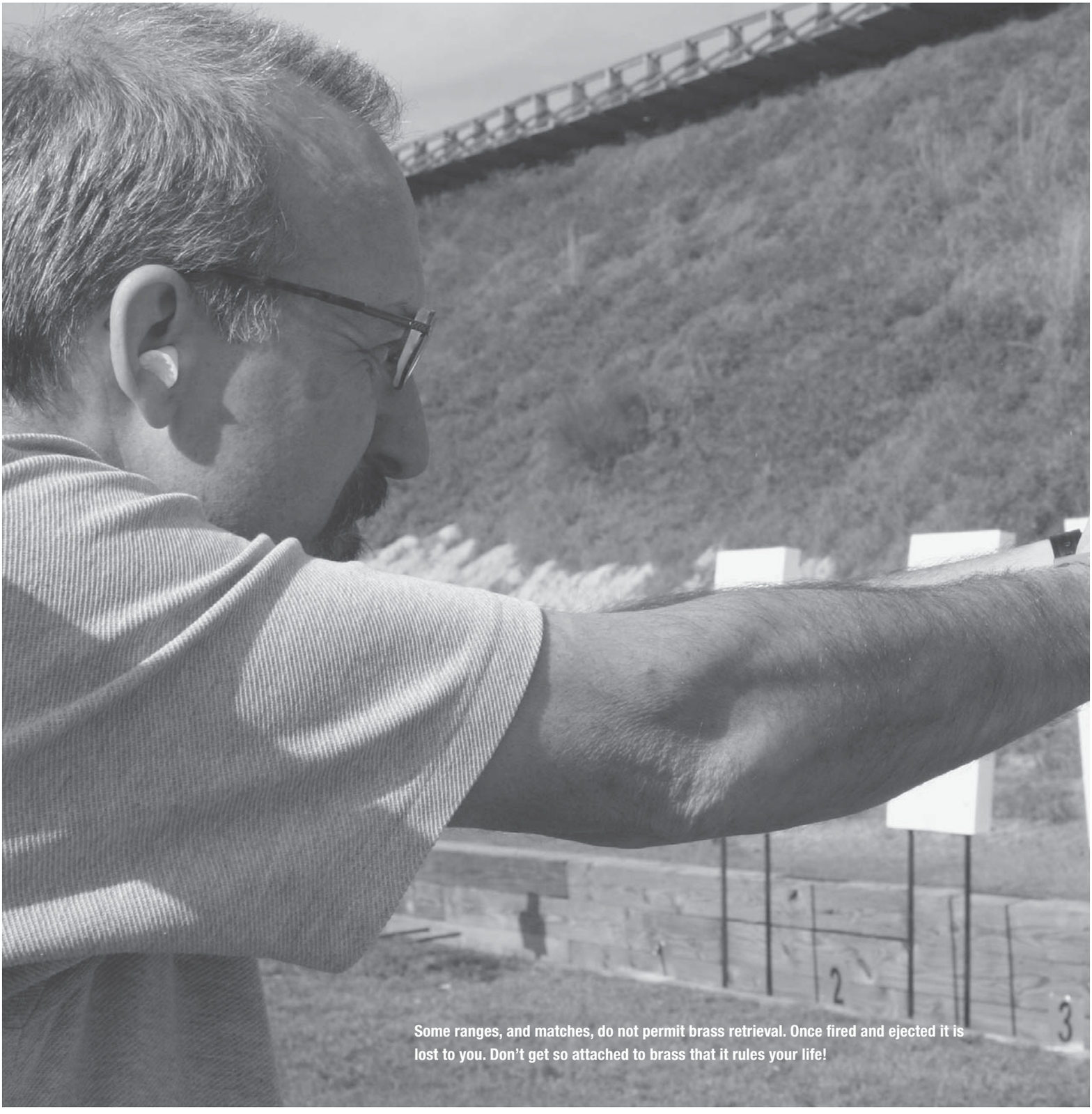
Cleaning is pretty easy. Unless you've stumbled on the mother lode that has been out there in the rain and snow too long and turned chocolate color as a result, you just have to clean brass in a tumbler. If it is muddy or really sandy, you might want to do a bit of dry "sacking." Use a mesh sack and slosh the brass around in the sack, letting the dirt and mud bits fall out. Or, rinse muddy/sandy brass in hot water. Dry in the sun, and you're ready to tumble.

Tumbling: Two hours is about right. Two weeks is longer than needed.

Tumbling is easy. Take your brass cleaner and wipe the bowl clean. Windex and paper towels will do. Then fill the bowl halfway or so with the cleaning media of your choice. I've always been a fan of ground corncobs. Some like ground walnut hulls for a finer and faster "cut," and some advocate rice. Halfway full, then cover the surface with brass. Dump a capful or two of polishing solution on top of the brass and turn it on.

If you get the proportions just right, the contents will swirl in the bowl and you can see them surfacing and submerging as they rotate about the bowl axis. Too much brass, or too much brass and media, and they just sit there, vibrating up and down. Too much doesn't clean as quickly. How long? It depends. Clean media, with relatively clean brass, will be clean in an hour, maybe an hour and a half. Grubby brass and heavily-used media can take two hours or more. Once you have the proportions figured out for your tumbler and caliber, just bolt the lid on, start and let it run for the time needed.

Vibratory cleaners come in various sized bowls. Buy the biggest your wallet and bench can take.



Some ranges, and matches, do not permit brass retrieval. Once fired and ejected it is lost to you. Don't get so attached to brass that it rules your life!

A timer to turn it off after a certain time period is a nice addition. Otherwise, you can end up like a friend of mine. He went on vacation, having started a brass tumbler the night before and forgetting about it. Sometime in the two weeks he was gone, the tumbler vibrated itself off the table, crashed to the floor and thrashed itself to pieces. Two hours is about right. Two weeks is longer than needed.

Next, you have to get the brass out. One trick I learned is to take the screen that came with your tumbler, place it over the opened tumbler, then invert and plop the whole thing onto a clean and empty five-gallon bucket. A quick shake or three, and the brass is separated from the media.

Set it down, lift the tumbler and put it on the bench. Take the screen with brass and set it aside. Now, spray the inside of the bowl with Windex, wipe it clean, let it dry, pour your media back in, add more brass, and turn it on again. Pour your clean brass onto a cookie sheet (not the one your wife/girlfriend/whoever uses to bake cookies) and inspect. What are you looking for? Obvious "not the same" brass. Once you get tuned in to a given caliber, anything that looks different will jump out at you. Some are easy, like the stray 9mm mixed in with the .45s. Others are a lot harder, like .380 brass in with 9mm, or 40 and .45. The better job you do here, the fewer situations where the wrong empty goes up into your sizing die, possibly wedging things to a complete halt.

Pick up a double handful, shake it in your hands, and toss into storage bins. Why not just pour it in? Because that way you can't listen. Each caliber of brass will have a distinct

frequency of "clink" or "chirp" to it. A cracked case will have a different, higher-pitch chirp. When you hear that, split the double handful, one to each hand, and shake each separately. One will chirp higher than the other. (Unless, of course, there were two cracked cases, and you have one in each hand.) Dump the non-chirping handful into the storage bin. Divide the other handful and repeat. Do this until you have winnowed out the cracked case, toss it into the scrap bucket and continue.

Why do this? Because it is faster than visually inspecting each one as you go to load it.

What bins to use? I've found that plastic storage bins, commonly found at big-box stores, work just fine. The size meant to store shoes will hold a useful amount of brass (and loaded ammo, once it gets that far in the process). Bigger bins will hold more, but there gets to be a limit of how much brass you want to have in a bin. Once you get more than a handful of them, label the bins so you don't have to pop each of them open to find out what is inside.

An afternoon spent sorting, cleaning, inspecting and storing brass can leave you with a couple of thousand empties in bins, ready to reload. A weekend, if you have that much brass, can have enough brass on the shelves to load for many months.

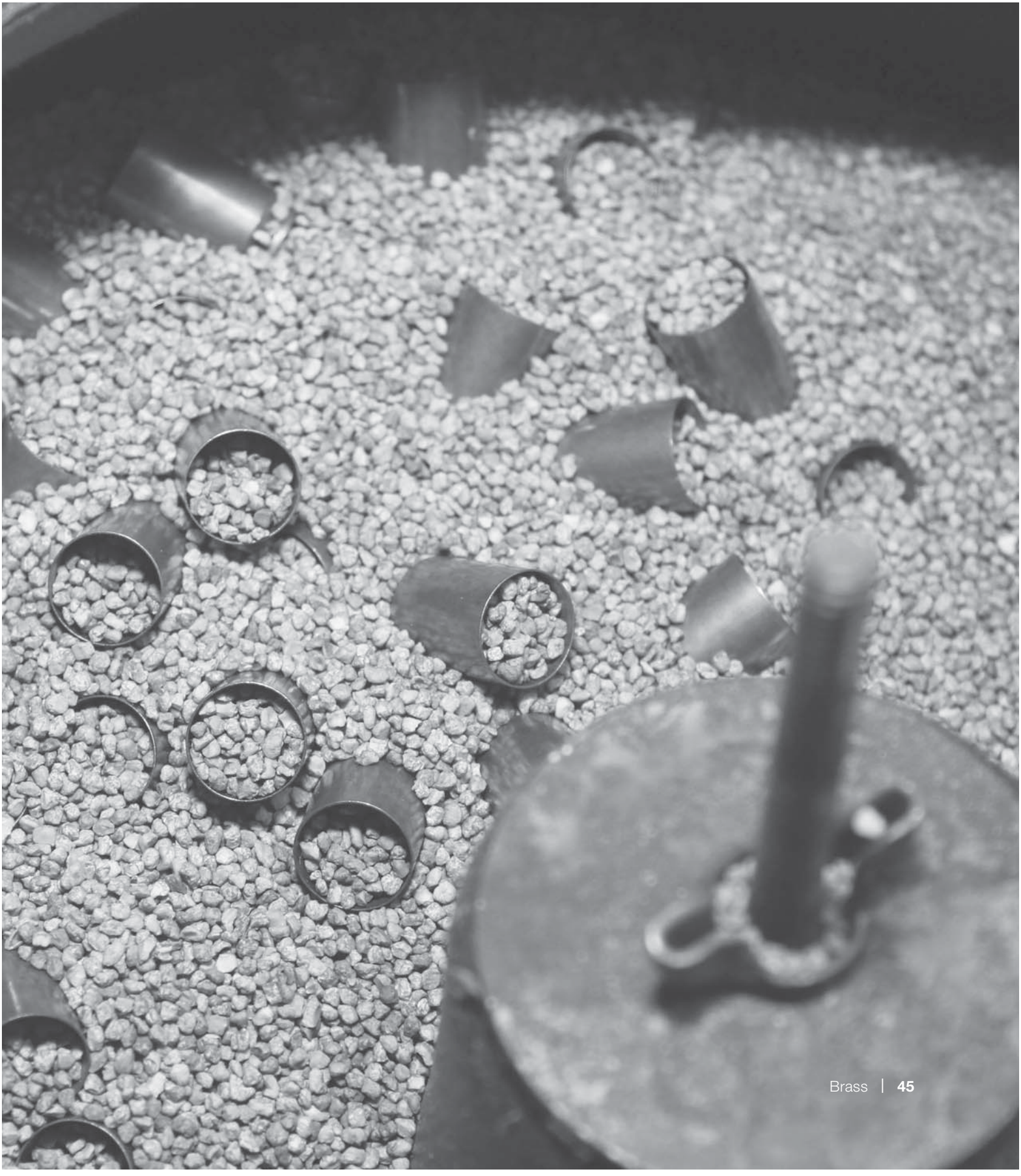
Only load the tumbler halfway with media, and put a layer of brass on top. If, when you watch (and we all watch, now and then) the brass isn't swirling, you have too much in there.

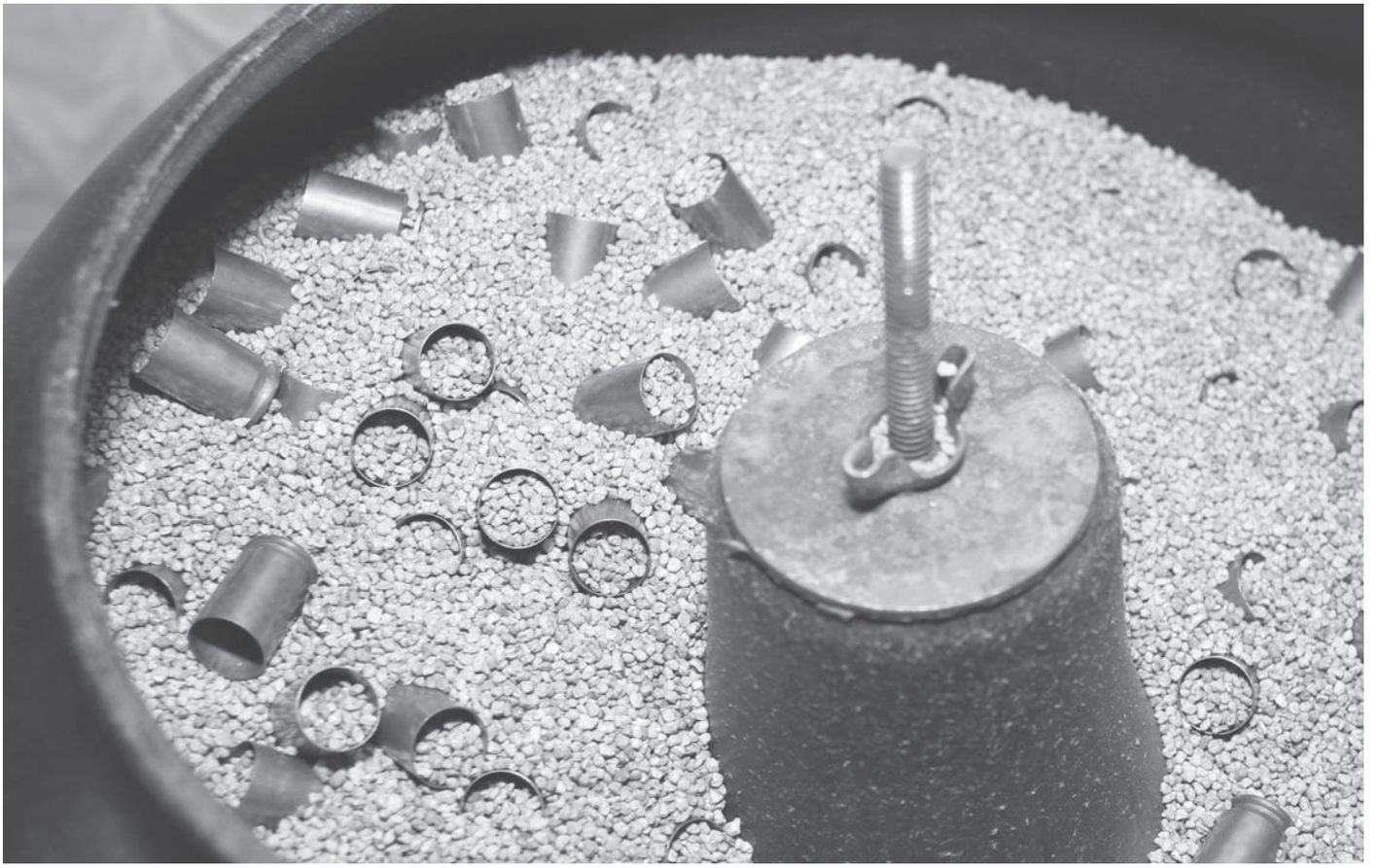
CARTRIDGE CLASSES

Not all cartridges are made the same. They differ almost as much as the people who load and shoot them. We can divide them into several classes and sub-divide them again.

High-pressure/Low-pressure

The first sort we have to make is between





If properly loaded, the level of brass and media has an actual wave shape inside the tumbler.

high-pressure cartridges and low-pressure cartridges. The top one in pressure today is the newest of the lot (big surprise there, eh?): the .327 Federal Magnum. It has a pressure ceiling of 45,000 psi, more than the .44 Magnum, .38 Super or the 9mm+P. Of course, helping it do so safely is its size. In any revolver, it is going to have very thick cylinder walls, and the small case head means less surface area for the case to thrust against the breech. Despite being a "mere" .32, the .327 can match the performance of a 9mm+P load. Definitely not your grandmother's mild .32 pistol for home defense.

At the other extreme is the .45 Colt, all 14,000 psi of it, less even than the .38 S&W. (Not to be confused with the .38 S&W Special, please.) That it operates at such a low pressure should come as no surprise, since it was designed at the very dawn of big-bore centerfire handgun cartridges. What is surprising to some is how much horsepower you can get out of it, if you're willing to put up with the recoil. It is possible to get a 250 grain hard-cast bullet up to almost 1,000 fps, and still be well under the pressure limit.

In-between we have all manner of cartridges, with .38 Special and .38 Special+P at 17K and 20K psi respectively, but both just behind the lowly .380, at 21K. Curiously, there is a band, and a gap. The band is cartridges with pressures from 15K to 21K or so. Then, we have a very few in the gap between 21k and 35K.

Boosting performance: If you want a magnum, go get a magnum.

The gap cartridges are the 25 ACP (which I do not cover in this book, it is just too much bother even for me to load), the .38 ACP and the Ruger-only loads of the .45 Colt.

Then, at 35K, we have a slew of cartridges that run from there to 37.5K, and finally, our big one, the .454 Casull at 50K.

Revolver/pistol

The obvious sort, revolver vs. pistol cartridges, is not as clear-cut as you'd think. The 9mm and .45 ACP, along with the .38 Super, have all been chambered in revolvers. And, the .38 Special and .357 Magnum have been chambered in pistols, the Special for Bullseye shooting, half a century ago, and the .357 In the Coonan, from the mid-1990s and again today. The .32 S&W Long is a special case, due to its having been for a long time the centerfire international competition cartridge. The bureaucrats who run the Olympics seem intent on getting gunpowder out of "sport" and they are pushing towards an all-airgun format. But for a long time, .32 wadcutter guns were the norm for international centerfire competition.

While some cartridges are more commonly seen with jacketed bullets only, they can all be loaded with lead bullets, so we really can't sort them that way. We can, however, sort according to how accommodating they are to length and bullet shape.

A revolver can take a loaded round up to the length of the cylinder, and of any shape. We used to load 230 grain wadcutter bullets in .38 or .357 cases, for bowling pin shooting. (No, that is not a typo – 230 grains.) We loaded them as long as possible, using whatever crimp groove allowed the assembly to stay under cylinder length. Pistols, on the other hand, since they have to rudely shove the cartridge up a feed ramp of some kind, are a lot less forgiving of bullet shape and length. It has to be within a range (which can vary from pistol model to model) and the shape allowed depends on the pistol design and skill of your gunsmith. That many gunsmiths were able to get the 1911 to feed bullets that otherwise were thought un-feedable is a testament more to their skills than anything.

One temptation in the field of reloading is to make a cartridge do something it wasn't intended to do. I still recall a reloading article of some 35 years ago, using 4756 to boost performance of the .38 Special. Now, the Special can be a softy, delivering average performance, but the intent was to make it a pocket magnum. Then, as now, my take is simple: you want a magnum, go get a magnum. Don't try to grossly exceed the performance of a cartridge just because you can. You will end up paying for it, somehow, if only in decreased service life of your firearm.

Ease of reloading

There is one more division, and that is ease of reloading. Some cartridges are easier to reload than others. A pair of really easy ones to load are the .45 ACP and the .38 Special. The .45 is so short, the cases do not wobble much

144 loadings later, he finally noticed a tiny crack in the case mouth.

on your shell plate or shell holder. As a result, you can work your press pretty quickly, knowing the cases won't catch on the edge of a die and crumple from the impact. The Special wobbles a bit, but not a lot, and both of them run at such low pressures that resizing is a dream.

On the other end, we have cartridges like the .32 Auto, which is so small just holding things is tough. Between placing teensy cases onto the shellplate or shell holder and perching tiny bullets on top of case mouths, the .32 is an effort. Another .32, the .327, is so long that wobble is in effect magnified as you lift the ram, and you have to have a smooth and steady hand to get speed loading it.

One that might not seem tough but can pose problems is the 9mm Parabellum. In the hottest loads, the case is so filled with powder that any untoward vibration spills some. The problem isn't in lost velocity due to spilled powder, but the mess and subsequent binding of the press when it builds up enough.

A different problem comes up with the .44 Magnum if you are reloading maximum loads on a progressive press. The cases can be so difficult to resize that you can't help but jerk the press around, and you practically stand on the handle to get each resized. If you are going to load right to the redline in the .44 Magnum (and other, even more robust rounds, like the 454 Casull), you might consider a separate, single-stage press. Use the single-stage press, with the longest handle that will fit, as a sizing-only station. Long leverage, and no need to worry about seating bullets or dispensing powder, can make the task easier. Once sized, then you can feed the cases into your progressive reloader for smoother, more consistent loading.

Your loading speed can be quite dependant on the caliber you are loading and the performance you expect out of it. Don't be thrown off by your buddies and their "I can load X number of rounds an hour." They are probably exaggerating an estimate and haven't a clue. What matters is that your ammo all works, safely, and performs in the manner you intend.

Why detail this? Simple:

BRASS LIFE

"How long will my brass last?" Good question. And as with so many questions in life, the answer starts out with, "It depends." First off, is it brass with a reputation for fragility? The cowboy .38-40 and .44-40 cases are classic examples where a slight dent on the case mouth (in some production batches) can damage a case so much it won't reload at all. So, treat them gently.

Other cases are indestructible, the .45 ACP being one of them. It is large and easy to handle. It is sturdy and operates at a low pressure. I have .45 ACP cases on hand that have been reloaded so many times that you can't read the headstamp from the battering the ejector delivers on each shot.

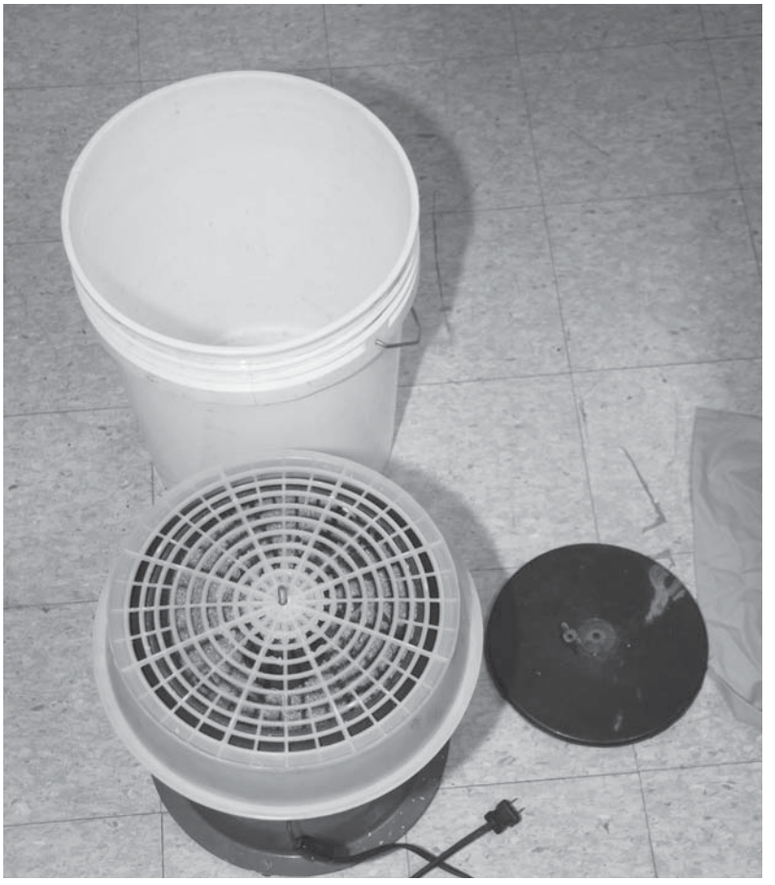
Pressure also matters. The higher the pressure, the more the case is worked and the shorter its useful life. The match between chamber size and re-sizing die size also matters. If the chamber is too big, and the sizing die is at the bottom end of the allowable specs, the case will be over-expanded and then sized down past the average. That works it even more, shortening its useful life.

In a test that is still relevant to this day, one of the writers of *Guns & Ammo* reloaded some .38 Special cases to see how long they'd last. It was the common target load of a 148 grain wadcutter and 2.7 grains of Bullseye, with the dies adjusted to work the case as little as possible while still providing proper ammo function. After a dozen loadings with no change, he gave up on the batch and simply loaded a single case over and over. 144 loadings later, he finally noticed a tiny crack in the case mouth.

The more careful you are to treat your brass gently, and the more you avoid brass-busting pressures, the longer your brass will last.

When you handle brass, get in the habit of "jingling" each handful. Learn the sound of good brass, and the sound of cracked brass.

To get the brass and media separated, get a five-gallon bucket and the screen that came with your tumbler.



Take the top off the tumbler, and put the screen on it.

Put the five-gallon bucket on the screen.

Turn the whole thing over, and shake or even turn on the tumbler. (Hold it in place, lest it vibrate off and break.)

If you stay within the proper limits, most cases will last a dozen loadings or more, which makes the per-shot cost of the brass cases, if you had to buy them to start with, just about nothing. And if you get brass free, or find it at the range, so much the better.

LUCKY HANDGUN LOADERS

In reloading handgun ammunition, you get a pass from some of the more onerous things that rifle reloaders have to do. Primary among them is trimming. I know rifle reloaders who keep brass sorted by batch, and who painstakingly measure the length of the fired brass and track it until they have to trim it to length.

Others just fire up a power trimmer and trim it all, every time. If the brass is still below maximum allowable length, then the trimmer doesn't trim, but it gets a whack at every piece of brass, every time.

Unless you are loading the real high-pressure brutes, and loading them to the maximum performance they deliver, you do not trim. As I've said before, trimming handgun brass for the vast majority of reloaders is a colossal waste of time.

Take the tumbler off, and your brass is in the screen, media in the bucket, and ready for the next step.

Spray glass cleaner into the now-empty tumbler.

Use a new paper towel to wipe the tumbler.

The paper towel will come out green from brass, and black from lead. Toss it. Wash your hands.

You can use ground corn cobs or even rice as a tumbling medium. Lyman makes corn cobs with polishing goop already mixed in.

How much so? A long time ago I got curious about the headspacing of the .45 ACP in 1911 pistols. The maximum case length/minimum chamber length of the .45 ACP is 0.898 inch. I had just bought my first digital readout dial caliper and I wanted to get the hang of it. So I sat down with a bin of .45 ACP brass and proceeded to measure until I got tired of it. Well, I got tired of it pretty quickly, as I could not find a single case so long as 0.890 inch long.

I then looked at the 1911s I had available to measure and decided I was not going to slip a feeler gauge between the back of the hood and the breechface to see how much extra there was. I'd just measure the depth of the chamber and call it good. The shortest one I measured was 0.905 inch deep. So, best-case, the .45 ACP had something like fifteen thousandths headspace going on in there, and in many instances more.

Your cases are 0.015 inch short and you're going to trim them to a uniform length? What, are you crazy? Or so bored that you need to find more to do?

Also, you are not going to need to chamfer

the case mouths (since you aren't trimming them) as your belling stem will give you mouth flare.

When rifle reloaders shoot brass too much, the neck gets brittle and the case body can stretch. They have to keep an eye out for incipient cracking near the base, leading to case separation, and for neck cracks. Unless you are loading a bottlenecked case (.357 Sig and .38-40 shooters, take note), stretching isn't a problem. Cases might crack, but when you jostle a handful of cases as part of your case prep you'll hear it.

In all, we're a lucky lot.

Jangled, cracked brass has a different sound than good brass. And each caliber has its own frequency. With a little practice you can sort out the cracked and mixed caliber brass.

If you see this 9mm brass, pitch it. There are batches and brands of brass that get bad reps for good reasons. Don't be so cheap that you struggle with bad brass.

Chapter Three:

BULLETS

You need something to hurl, in order to be shooting. Otherwise, you're just making noise. But what bullets? What kind, weight and composition? The common, traditional bullet is lead. Lead has many useful attributes; it has a low melting point, high density, low cost (relatively speaking) and is easily shaped. It is, however, viewed in some circles as being highly toxic. Well, yes. But, "dose makes the poison." Take the basic precautions and you won't have a problem.

Lead bullets are commonly alloyed to make them harder, to allow them to fill moulds more readily and to adjust diameter. Diameter? Yes, if you take a bullet casting mould of any given diameter, the diameter of the bullets produced can change, depending on the composition of the alloy you cast in them. Unless you are going to do your own casting, that is a theoretical consideration. But hardness isn't. To understand hardness and the need, let's look at the bullet's flight (the title of a very interesting book by Richard Mann, written in the 19th century and still relevant).

The powder charge goes off and the pressure slams into the base of the bullet. The bullet is pushed forward, exiting the case and then the chamber. If it is in a pistol, it slides right from the case into the rifling. If it is in a revolver, it has to jump out of the case, from the chamber throat, across the cylinder gap, into the forcing cone, and then to the rifling.

If the bullet hardness and the pressure are properly matched, the base of the bullet upsets, or obdurates, just enough to provide a gas seal. The bullet scoots forward, engages the rifling, spins and is on its journey. If the pressure is too high or the bullet too soft,

Full metal jacket bullets usually aren't, they have the base with the lead core showing.

the base over-obdurates, creating increased friction to the throat and rifling. It can also lead to a partially-molten bullet base, which is really, really bad. If the pressure is too low, the bullet won't upset at all. The gas can sluice past the bullet, a process called flame-cutting. It will melt the sides of the bullet, producing leading and poor accuracy. A bullet that is too hard won't obdurate at all, and will be similarly flame-cut.

This process is obviously affected by bullet diameter. If the bullet is too large, it will have greater pressure. (More resistance produces more friction, leading to more pressure.) A too-small bullet will flame-cut like a banshee.

So, when you are ordering your cast bullets, hardness is not the only thing to look at, and harder is not always better.

We also have the problem of multiple diameters to consider in revolvers. The bore of a barrel is the diameter of the rifling cuts, down to the bottoms of the troughs. Let's use the .45 colt as an example, as it has been made for a long time and subject to a lot of changes. Until the 1950s, the common bore diameter of the .45 Colt was held to be .454 inch. With the rise in popularity of the .45 ACP, manufacturers drifted down to its bore diameter, .452 inch, as the standard for all .45-caliber firearms, ACP and Colt. So, you can have a Colt revolver from 1920 and a Colt revolver from 2010, and they can have different bore diameters. A 1911 from then and now is much less likely to wander.

But it gets worse, a lot worse. The portion of the chamber, forward of where the case rests, is smaller than case diameter. Called the "throat" in many circles, this should be the diameter of the bullet being propelled, or

When ordering cast bullets, hardness is not the only thing to look at, and harder is not always better.

only a smidgen larger. It has, however, been all over the map. It is not uncommon to read of reloaders in decades past who measured their Colt to find the throat diameter at .456 inch, .458 inch or more. A .454-inch bullet, sluiced through a throat of .458 inch will lead, and it will arrive in the forcing cone already shedding lead. The throats will lead, the forcing cone will lead, the bullet will suffer grievously and accuracy will suck.

The usual first reaction to leading is "Ohm ygod,thebulletistoosoft" and then load harder bullets. Harder bullets in this instance will only make it worse, as the bullet flame-cuts just the same as the soft one did.

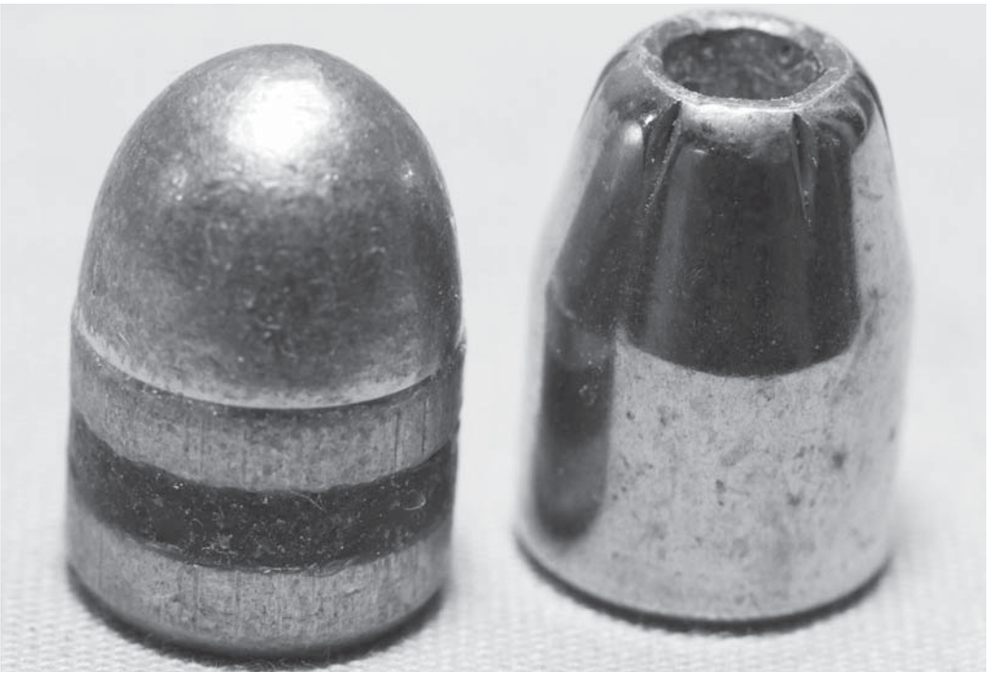
The solution is twofold: larger diameter, to match the throat if at all possible, and soft enough to obdurate at the pressures involved. "But, you can't send a .456-inch bullet down a .452-inch bore." You can if it is soft enough. And properly lubed. (In this instance, fat chance of finding a .456-inch bullet. You'll have to cast your own.)

Or, use a lubed, hollow-base bullet and let it bump up to fill the throat and then squeeze down to fit the bore. As a final option, a new cylinder, reamed with throats of the correct diameter. This was a last resort choice, but done in the old days when there were more (typically for the Colt SAA) cylinders available, and fewer factory-new choices.

To diverge slightly, the solution was to take a leading-prone and oversized-throat .45 Colt, find an inexpensive .38 Special cylinder, and have the charge holes/chambers reamed out to .45 Colt and correct throats. Then the new cylinder would be fitted to the gun (setting back the barrel if need-be) and all was hunky-dory. It ended up costing twice as much as a new gun, but the accuracy was typically top-notch.

Lead bullets are not just cast, they can also be swaged. In swaging, lead wire is cut to proper lengths, and then the bullet maker uses hydraulic presses to simply squish the lead wire segments into bullet shape. Then the bullet is coated (usually with a dip or wash) with lube, boxed and sold. Obviously, a swaged bullet is a lot softer than a cast one, and thus more suited to low-pressure uses.

Plated bullets are truly full metal jacketed, but the nomenclature is either "plated" or "total metal jacket."



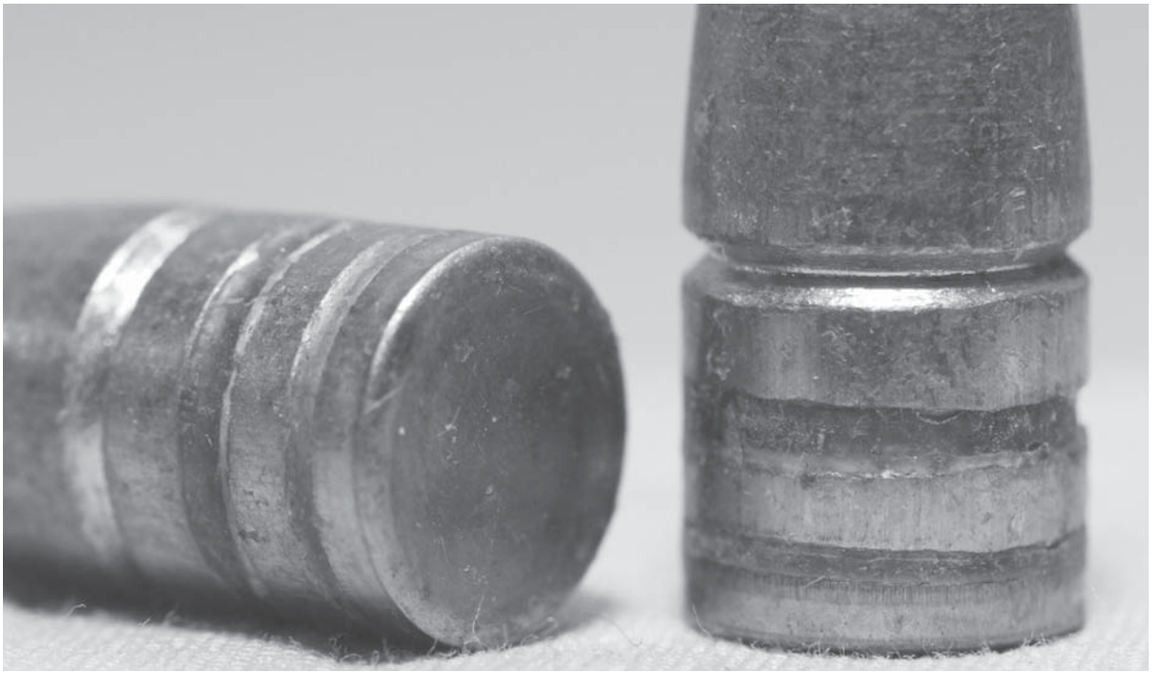
The basic, century-plus old lead round nose, next to a jacketed hollowpoint.

JACKETED

Jacketed bullets won't flame-cut, but they are not all that keen on obdurating, either. They will, but the pressures involved are typically a lot more than with lead bullets. Jacketed bullets offer many advantages – no leading, controlled expansion, higher potential velocities – but they do so at higher cost. Not always, but often.

Jacketed bullets come to us via two manufacturing methods: cup-and-core and bonded. In c-c bullets (jhp, softpoint, and fmj*), the lead wire, as with swaged bullets, gets cut to length then slammed into an open copper or gilding metal (95 percent copper, five percent zinc) cup. The bullet is pummeled, squeezed, shaped and given a finish slam to keep things together, and that's it. In an interesting aside, the last step of manufacture of cup-and-core bullets is to hydraulically press the core into the jacket. You see, gilding metal is springy, but lead isn't. So, if you

On the lead round nose, note the cylindrical bearing surface, and the rounded nose above. A good design (which this is) has them as separate components. Older designs had the round nose blending smoothly into the cylinder, and typically they didn't shoot as well as this one does.



Cast lead bullets can also have a gas check. The gas check works like a set of copper galoshes, keeping the base of the bullet protected from the powder gases.

The truncated cone. The TC was the original 9mm Parabellum design, back in 1904. It suddenly became vogue in the U.S. with the adoption of the 40 S&W, in 1990.

finish-size to diameter a jacketed bullet, the lead gets squished down, but the jacket then springs back. Granted, the spring is perhaps a ten-thousandth of an inch, but it is there. So, the lead core gets re-swaged back out to the jacket interior walls.

Under more-or-less normal use, the two stay together. However, when jhps actually expand, it isn't unusual for the lead core and the jacket to separate, which is bad for terminal performance.

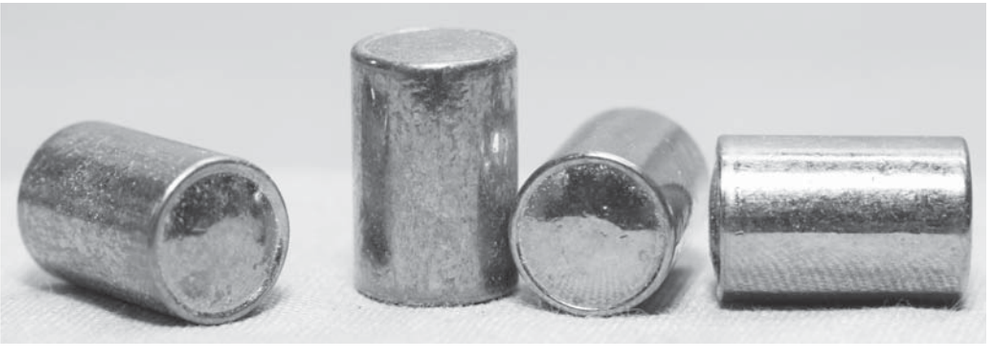
Bonded bullets are those which essentially (each maker has their own proprietary process) the lead core is soldered to the copper/brass jacket. They can't separate. No matter how you peel back the jacket, the lead core will stay bonded to it. And the lead, being quite malleable, will stay attached to itself. Bonded bullets have a stellar record of expanding while remaining intact, even after penetrating intervening obstacles like windows, sheet metal and heavy clothing. But the process of bonding adds cost.

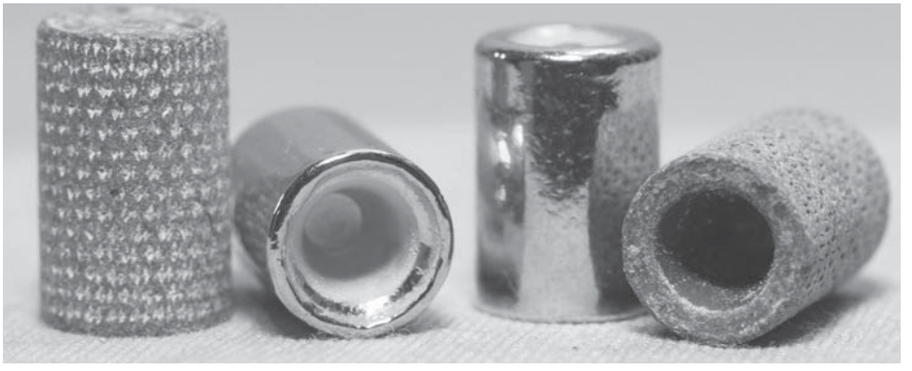
* *jhp = jacketed hollow points; fmj = full metal jacket*

PLATED

Plated bullets are made to offer the best of both worlds – lead and jacketed. The soon-to-be-plated bullet core is typically swaged to shape. Then, the bullet cores are dunked in a chemical solution, and while in the solution

The double-base wadcutter is a simple cylinder, and can be loaded in either direction.





The hollow-base wadcutter. The bullet is loaded base-down, and it acts exactly like a minié ball. The skirt expands to grab the rifling, and the nose-heavy design keeps it going straight. And yes, they travel a lot further than 50 yards.

an electrical charge electroplates them with copper. The trick is to plate the bullets as individual bullets, and not just plate the whole pile of them into a copper-encased blob. How do they do it? I don't know. They won't say, and I don't blame them.

One thing that I do know is that plated bullets can be very good, but they can have some quirks. The soft core has a soft plating, and the thickness of the plating makes a big difference in the final product. Thicker is better. Also, the plating process, since it has to use some method of keeping the bullets apart, ends up with bullets that aren't as "crisp" as jacketed ones. However, that can be solved to a certain extent. One method of making plated bullets even better is a secondary swaging operation, often called a "double-strike." There, the plated bullets are individually swaged to final dimension, and the swaging cleans up some of the vagueness of the bullet dimensions. You can recognize such plated bullets by the impact mark on the base, a circular pressed area.

The plated bullet is not a jacketed bullet, it is a compromise. It is meant to deliver many of the benefits of a jacketed bullet, at something closer to the cost of a cast lead bullet. The hardness/durability of the plated bullet depends on the alloy of plating, the thickness plated and the pressure used to double-strike the finished product.

While a plated bullet can be successfully launched at a higher velocity than a cast bullet (generally, it is possible to fire some cast designs/alloys at low rifle speeds), it cannot do as well as a jacketed bullet. The maximum velocity of a plated bullet tends to be about 1200 fps. So I did not try to load any of them hotter than that. If I really feel the need for more speed than that, I'll go with jacketed bullets.

BULLET SHAPES

We are concerned with four basic shapes which serve the vast majority of needs: round nose, truncated cone, semi-wadcutter and wadcutter.

Round nose

Just what you'd expect – a rounded contour. There are many variations of contour, from near-hemispherical to quite pointed. Generally, they are used in pistols for reliable feeding and in revolvers for fast reloads. Round nose can be full metal jacketed, all-lead, or soft-points.

Truncated cone

Take a cylinder. Cap it with a cone. Now, whack a flat tip on the cone. That's a truncated cone bullet. Generally, most modern jhp designs are a truncated cone, one that just happens to be open on the end. The biggest user of the design is the .40 S&W, where the standard fmj design is a jacketed truncated cone.

Semi-wadcutter

The semi-wadcutter is meant to do two things: feed well (due mostly to the radius of the truncated cone if its tip being the same as a round-nose, in location and diameter) and cut a clean hole in paper or cardboard.

Wadcutter

The wadcutter is a target bullet, meant to be accurate and cut a clean hole in paper or cardboard. One aspect of the wadcutter that is overlooked is that it cuts a clean hole in other things as well. A hard-cast wadcutter, booted along at standard velocities, penetrates quite well.

A descriptor for bullets is a "flat point," which generally means a rounded contour with a flat on the end, called a meplat. The flat point bullet comes to us from handgun and rifle bullets of the late 19th century, where they were often used in lever-action rifles. The flat point kept the primers of the stacked rounds out of the way of the bullet tips, while the rounded contour allowed for reliable feeding. Such bullets worked just fine in handguns as well, thus their common use in cowboy-chambered handguns.

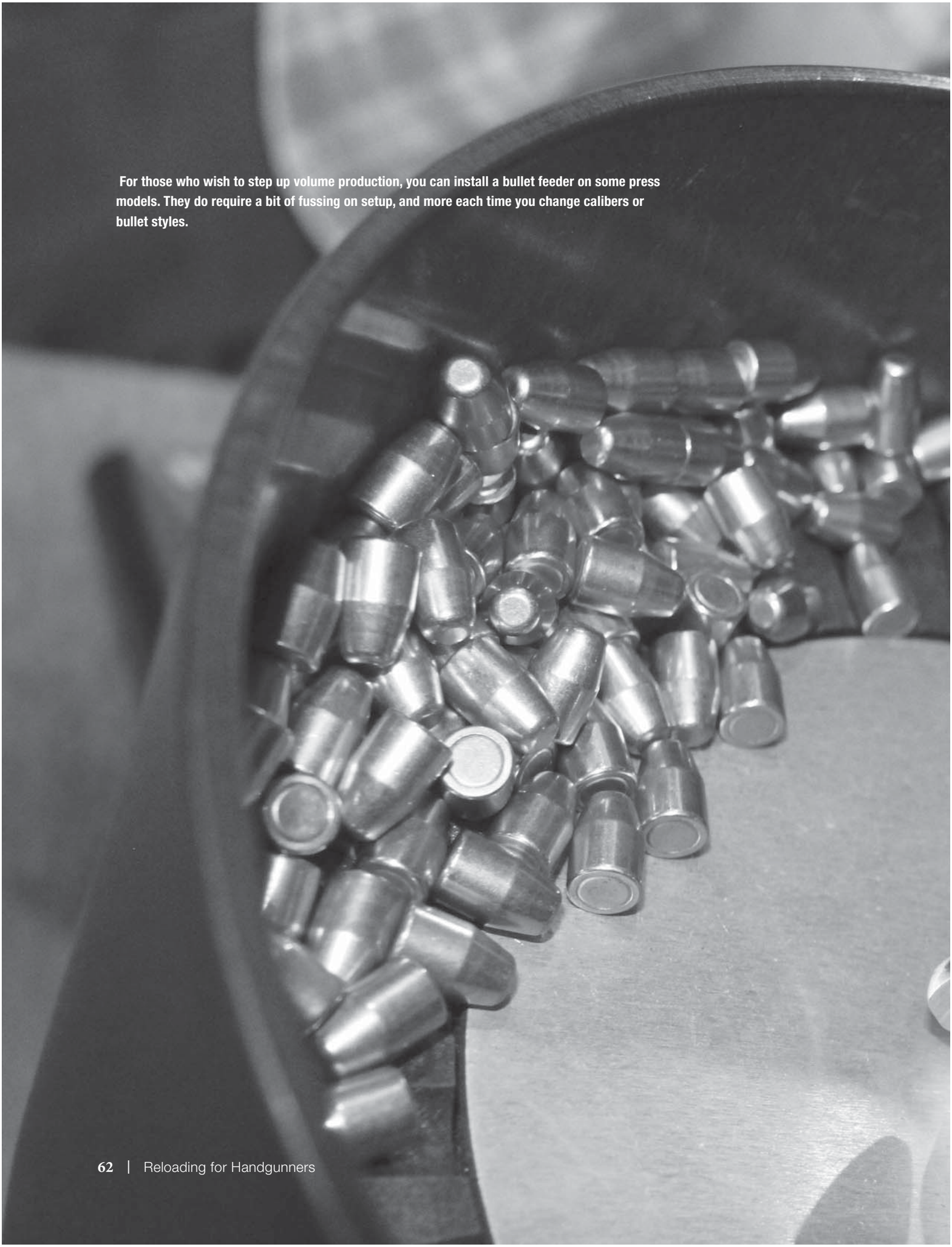
BULLET VOLUME/ BULK

If you are going to reload and "save money," you'll have to buy in bulk. Bullets are lead, and lead is heavy. A thousand 9mm bullets, 125 grain hard-cast lead, weigh 17.8 pounds. Ten thousand of them weigh 178 pounds. Similarly, .45 230 grain lead round-nose bullets weigh 32.8 pounds per thousand. A couple of decades ago I and some other shooters bought a passel of 150 grain bullets for use in .38 Super. At 21.4 pounds per thousand, you can do the math.

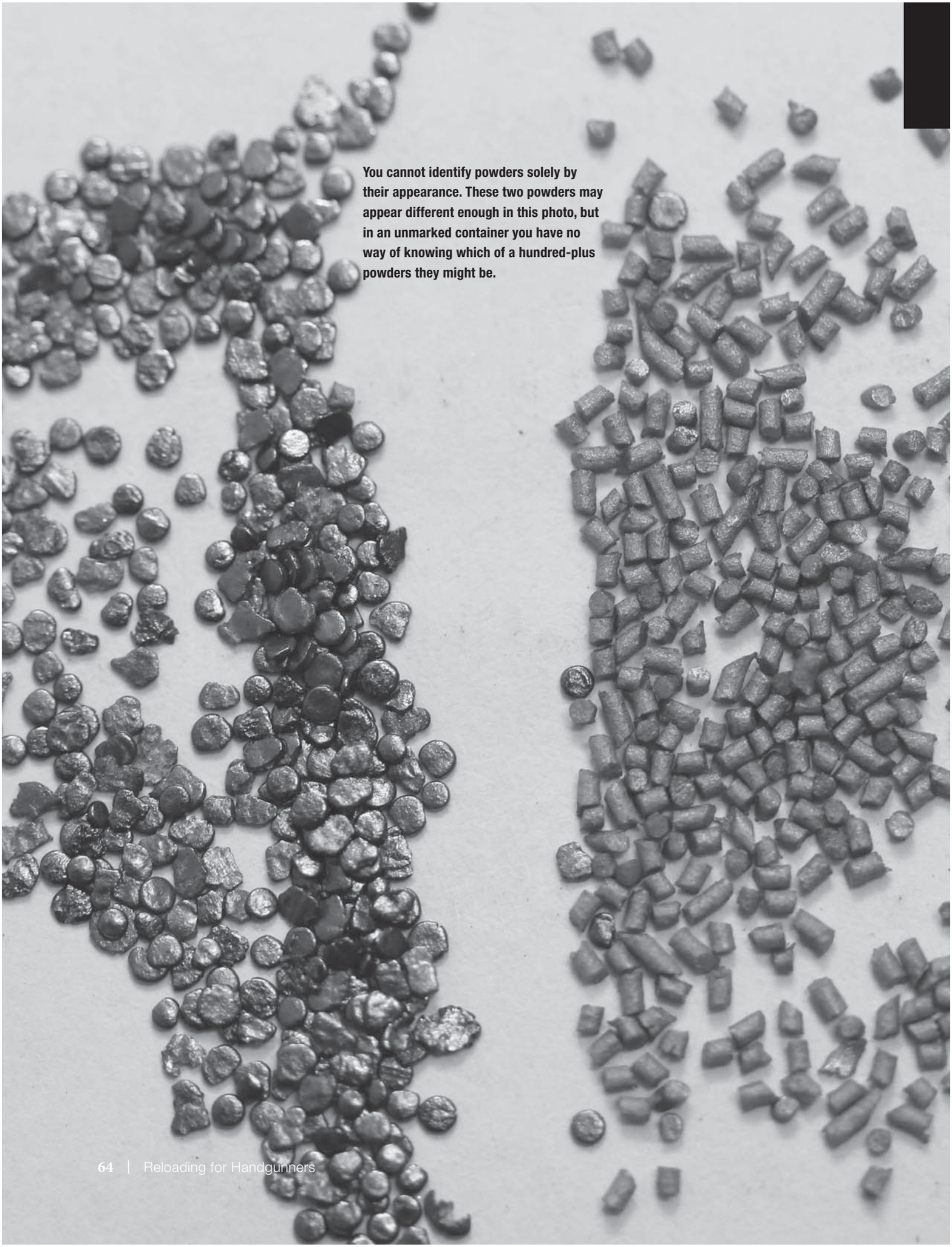
I met the caster at one of the USPSA nationals, where he arrived in a Ford F450 duallie turbo. Other shooters had the same idea, and he was delivering something like half a million bullets, massively over the rated payload of his truck. My poor truck labored to bring back the "paltry" 50,000 bullets I was there to pick up. And my payload was only some 15 percent over max.

Shipping on bullets will kill any "deal" you may find online. To save money you have to buy in bulk. To save the deal, you may have to arrange pickup. It is not at all uncommon for shooters to go and compete at a particular match solely to meet their bullet-maker there and pick up a year's worth of projectiles.

Once you have them, use the mass. Weigh down your loading bench so it doesn't move when you load on it.



For those who wish to step up volume production, you can install a bullet feeder on some press models. They do require a bit of fussing on setup, and more each time you change calibers or bullet styles.



You cannot identify powders solely by their appearance. These two powders may appear different enough in this photo, but in an unmarked container you have no way of knowing which of a hundred-plus powders they might be.

Chapter Four:

POWDER

This chapter is going to be packed with info and a lot of my telling you things that you cannot, should not or must not do. At times I will risk sounding like I'm hectoring you. At times I'll be contradicting the advice of your buddies or the "best shooter" at your club. I hate to throw down the gauntlet, but it must be me or him. You came to me for advice, if I'm telling you he's wrong, do as I say and proceed carefully.

The closest comparison of powder to anything you might have common knowledge of is gasoline. A cartridge is, at its heart, exactly like a cylinder on your engine. (At least until we go all-electric, and then I don't know what I'll compare a cartridge to.)

While the cylinder won't be compressing the fuel-air mixture, once the primer goes off (just like the spark plug) it drives the cylinder away from the combusting mixture. In the case of powder, the fuel and the air are already there, so no mixing is needed. Yes, Virginia, your cartridge will discharge in space. Whether your handgun itself will work in a vacuum is another matter, and one that none of us will ever get to test.

Just like gasoline, powders have different burning properties. Powders are not rated by octane, but by burning rate. If you look in any reloading manual you'll see a chart of powder burning rate. What it tells you is their ranking, but not their rates. Why not? Simple: rate depends in part on the peak pressure of the combustion. Change the peak pressure, and you can change the absolute rates and sometimes the relative rates. As such, they are ranked in burning rate at their customary peak operating pressure.

Let us take a pair of examples wildly out of

their burn rates. Let's take a slow rifle powder like 4831 (it doesn't matter which one of them) and try to use it at the customary peak pressure of, say, a .45 Colt. That is, 12,000 psi. We may not be able to get the powder to ignite at all. As soon as it does, it will probably push the bullet ahead of it before full ignition can be attained, and we'll end up with a revolver full of unburned powder granules. Below a certain rate, powders don't want to burn. That's why you can only ease up on the charge of any given powder so much before it starts acting up on you.

On the other end, let's try to be cheap, and theoretically load some fast-burning pistol powder up to run our 7mm Magnum. Meant to run at or even under the pressures of the .45 Colt, once we get whichever one we use as a thought experiment even to the handgun magnum pressures, let alone to rifle pressures, it becomes unstable. One round might work as expected, but the next could double pressures. It will blow up your rifle, so don't even think of doing it.

And people have done it, usually inadvertently. Get the wrong powder on your bench, and the least you can expect is a mess. Worse, a blown gun and injured shooter. People have died from such accidental cartridge/powder pairings.

Another aspect of burn rates that trips up a lot of people is that the chart is not linear. That is, just because you moved, say, 10 percent along the list, does not mean you have changed the burn rate by 10 percent. You could be using one of a bunch of powders that are in a cluster of similarly-burning powders, and you could move ten powders over in that group and not change burn rate by two percent. Conversely, you could be leaving a cluster of like powders, and the next one on the list is 10 percent faster or slower than the one you just left.

If you decide to try another powder, do not just assume that "since it is next to what I used on the chart, I can use my old data, and see what happens." Look it up all over again, and do your due diligence.

Published data has changed over time. The usual reaction from some quarters is "the lawyers have elbowed in, and powder charges have been lowered." The typical "reason" for this is either because lawyers are timid souls who wish to avoid offending anyone and want the world to be filled with flowers, puppies and low-fat milk. Or, greedy corporate types want to keep factory ammo at full power and by restricting loading data reduce the powder of reloads.

It is almost as if some reloaders feel that the "powers that be" are stealing fps from them.

I don't feel that way, and if we ever meet and you wish to discuss your take on this, do not be surprised if I simply walk off. The changes have been made for good engineering reasons.

The old method of pressure measuring was the copper-crusher (or lead, in some pressure ranges) method. A test barrel, with a hole in the chamber, had a small copper cylinder held in place over the hole. When fired, the gases hammered the copper cylinder (escaping out through the provided hole) and the impact of the pressure shortened the cylinder. Measure the difference between fired and unfired cylinder lengths, and you "knew" the pressure. Well, what you actually knew, in a very broad sense, was the total amount of work done to the cylinder. This was rated as Copper Units of Pressure, or CUP.

The current method is to strap a transducer to the test barrel. When the test round is fired, the steel of the barrel stretches (it is elastic, a bit, at these pressures) and the changes in electrical potential of the transducer tell the engineers how much pressure there was. Or, drill a hole and insert a piezoelectric sensor into the hole. The resistance of electrical current changes as pressure changes, and the pressure (resistance to electrical flow) can be measured. These methods are rated in psi (pounds per square inch). Unlike the copper cylinder, the transducer/piezoelectric sensor tells the engineers exactly how much, and when, in slices of time measured in microseconds. The more expensive and sensitive the sensor, the more info gained.

In the case of some powders and loads, what appeared to be a safe load measured in CUP turned out to have all kinds of spiky pressure curves measured in psi. Yes, it is a load that has been used for decades, but with the new gear we discover what was a sedate, 17,000-CUP load actually ran at an average of 17K, but also produced a momentary spike of 25,600 psi. The old copper cylinder method could not react to the momentary pressure spike fast enough to resister it, and thus we never knew, in all these decades, that it existed. If the cartridge in question has a ceiling of 19,000 CUP, we can't very well go on telling people to use that load, now can we?

Last point on this: there is no "universal translator" for CUP to psi. It isn't as simple as "multiply CUP by 1.X and you get the same pressure measured in psi." The engineers (called ballisticians in the trade) had to re-generate all the data with each and every caliber/powder/bullet combo. They wanted to, they tried to, come up with a translation, and failed. They are thoroughly sick of people telling them what it "ought" to be, and will perhaps be even testier about the subject than I have been.

POWDER BRANDS

There are not all that many powder makers in the U.S., or the world for that matter. Making smokeless powder is an expensive, dangerous undertaking, and doing it wrong can mean more than just unsatisfied customers. As a result, there are instances where the same powder was sold under two different names. The chief culprit (if we can use that word here) was WW-231 and HP-38: the same powder, in different bottles, sold by different companies. Interestingly, the loading data produced by those two companies did not always agree. Such is life. Also, a little knowledge can be a dangerous thing.

You will find interesting similarities in load data between powders, if you pore over enough loading manuals. Just because two powders have very similar burn rates and powder weights used in one caliber does not mean they are similarly suited to another.

Another thought experiment. Let's look into Powder A and Powder B. They both produce 850 fps when you dump 5.0 grains of A or B into a .45 ACP case and stuff a 200 grain LSWC on top. Cool. Powder A also produces 1200 fps when you drop 11 grains of it into a .44 Magnum case and put a 240 LSWC on top. Does this mean you can also use 11 grains of B?

Only if a professional loading manual says so.

It may well be that Powder A maintains its

burn rate up to 40,000 psi, making it suitable for use in the .44 Magnum. Meanwhile, Powder B goes all squirrely at 27,000 PSI, and by the time you get to .44 Magnum pressures it is quite unhappy. Down at 17K, the .45 ACP pressure zone, they are very much alike. Above 27K, they are not. You don't know this, and have to trust the manual writers to tell you.

CANISTER POWDERS

Making powder is as much art as science. A powder that we reloaders use has to be the same, from production lot to lot, year to year, or we could be in trouble. The powders, as-produced, can and do vary slightly in burning rate. If the rates are close enough, a powder maker will blend powders. Let's construct an example. Say a powder maker produces two lots of XYZ powder. They have identical densities (weight per volume) granule size, flow rates (through a measuring dispenser) but they differ: one has 97 percent of the expected burn rate, and one has 103 percent of the expected burn rate.

They simply mix equal parts of each, test, bottle and ship. YOU CANNOT DO THE SAME.

Do not try to make a "custom" powder by mixing two different powders. First of all, they may not stay mixed. This isn't like dissolving sugar into your favorite coffee beverage. If they settle out, you'll be in trouble. Don't be cheap, use the powder you have as-is. If you want something different, buy it.

Now, the ammo companies buy powder from the powder makers. In the case of the XYZ powder above, they would not buy blended powders, they'd simply buy the two lots, test each, load each, and mark them as separate production lots of that ammo.

If you have two otherwise identical boxes of a factory load but they have different production lot numbers on them, that simply means *something* was different. The bullets could have come from two different bullet-production lots or two different suppliers. There could be two different powders in them. Or as above, two different lots of the same powder. Which is why you cannot use the powder charge in a factory load as a guide to your own loading. The fact that your favorite .357 factory load uses (as an example) 12.5 grains of powder tells you nothing about how much of the powders you have, you should be using.

HOW LONG DOES POWDER LAST?

Powder manufacture requires a lot of acid. The various chemicals used to create gunpowder all have to be pure, many acidic, and the end result is a product that has to have the acid neutralized. When you open a can or jug of powder, it will smell sour. That is the residual base neutralizer left to counter any latent acids that weren't fully washed away.

Stored in a cool, dark location, powder can last decades. Many decades. If not, it will "last" only a short time. If you re-open a storage container and it smells acidic or sharp or doesn't look like the others of that type, it probably has gone bad. Trying to use it is simply asking for trouble. As a highly nitrogen-based compound, it makes good fertilizer, as long as it is soaked with water as soon as you pour it out. Soak it, disperse it and leave it alone afterwards.

CAN I INADVERTENTLY BLOW THINGS UP?

You bet. One of the easiest ways to do so is to fail to follow good reloading habits. Store your powder across the room from where you reload. When you are going to load a cartridge, take a bottle of your powder from wherever you store it, bring it over to your reloading bench and keep it there while you load. When you finish, pour the remaining powder back into the jug and take it back to where you store powder. NEVER have two or more powders on the loading bench at once.

Every powder maker has had the experience, "Your powder blew up my gun." The reloader sends in ammo and when the powder maker's engineers disassemble one they find the wrong powder inside. Yes, Elmer Keith loaded many a .44 Magnum round using 12 grains of 2400. What he didn't load was 12 grains of [fill in the blank with any fast-burning pistol powder]. Keep the powder you are using, and only that powder, on the bench. Empty the powder measure when you're done, so there is no leftover powder in the measure.

If you want to load a soft-recoiling load, move down in powders. That is, if you want to take a break from your (to pick on it again) .44 Magnum and the Keith load, do not look to get 800 fps by using less 2400. As mentioned before, each powder needs a particular pressure to burn effectively. If you try to get by with less, the powder burns less and less efficiently, until poof, you get a squib.

And the problem with a squib is? It isn't always noticed. With a bullet in the bore, you are all set to get yourself into an expensive repair, in just a few seconds. A second round slamming into the lodged bullet is bad for the gun.

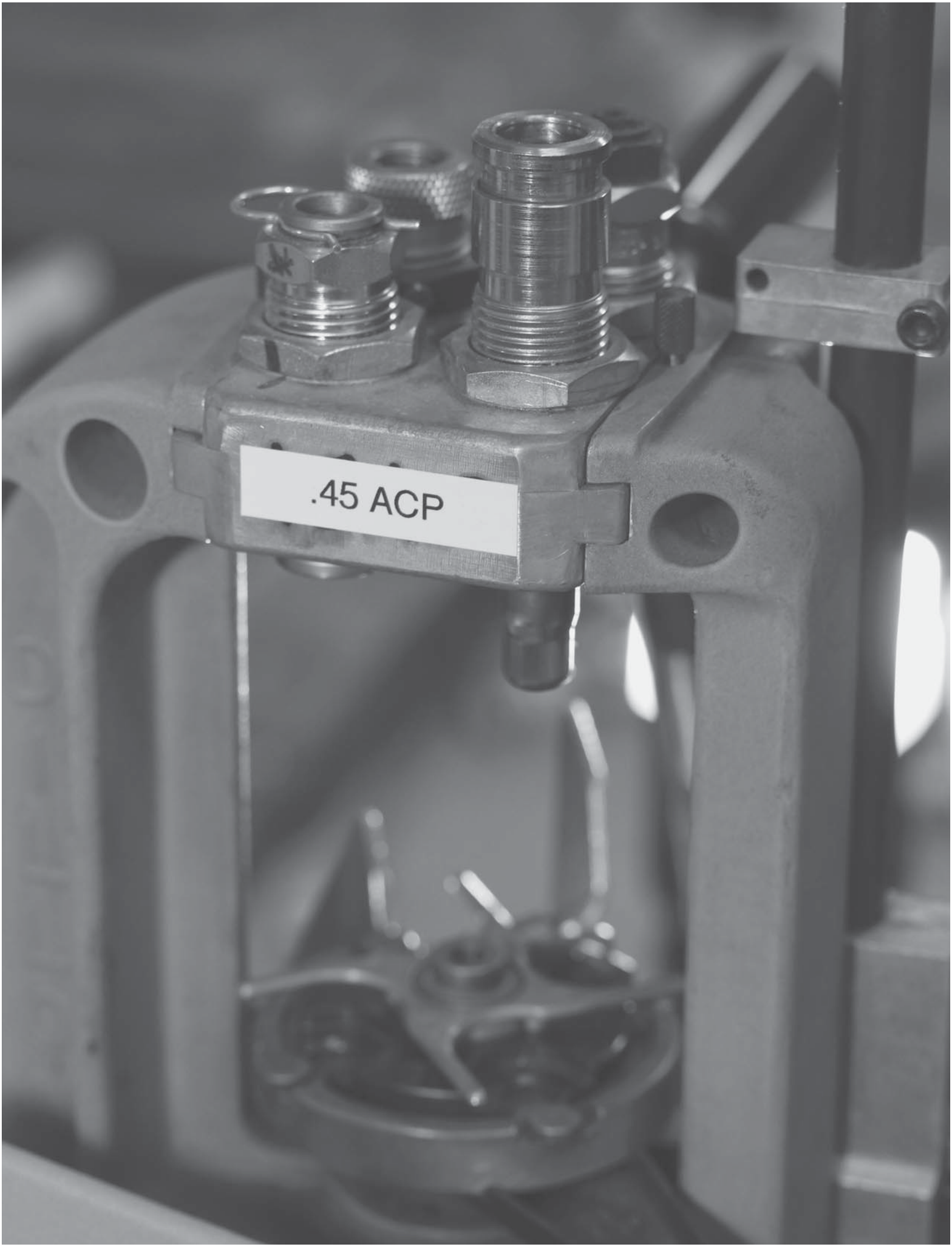
To get a lighter load, use a smaller amount of a faster-burning powder.

BUT POWDER COSTS MONEY

Yes, and so does repairing or replacing a handgun. I have been asked more than a few times, "What is the minimum number of powders I can get by with?" The answer is, obviously, one. You just can't use it to load for everything. Okay, smartypants, what is the minimum I can get by to load all the calibers I load, and for all the uses I have? Three or four. That should cover you for all the calibers here and for all the uses from target softy-recoil, to high velocity, to heavyweight hunting loads. Which three or four? Almost any combination of what's out there. If you simply take the span of handgun powders, divide them by four, and pick one at random from each group, you could probably do the job.

We all have our favorites and, while I realize that my job here is to offer advice, I don't want to steer you away from perfectly good choices. A lot of the data you will see here is simply that which I experimented with or found satisfactory in years of reloading. I did not undertake an exhaustive analysis of the powders available.

A second round slamming into a lodged bullet is bad for the gun.


.45 ACP

Chapter Five:

SETTING UP AND MAINTAINING YOUR DIES

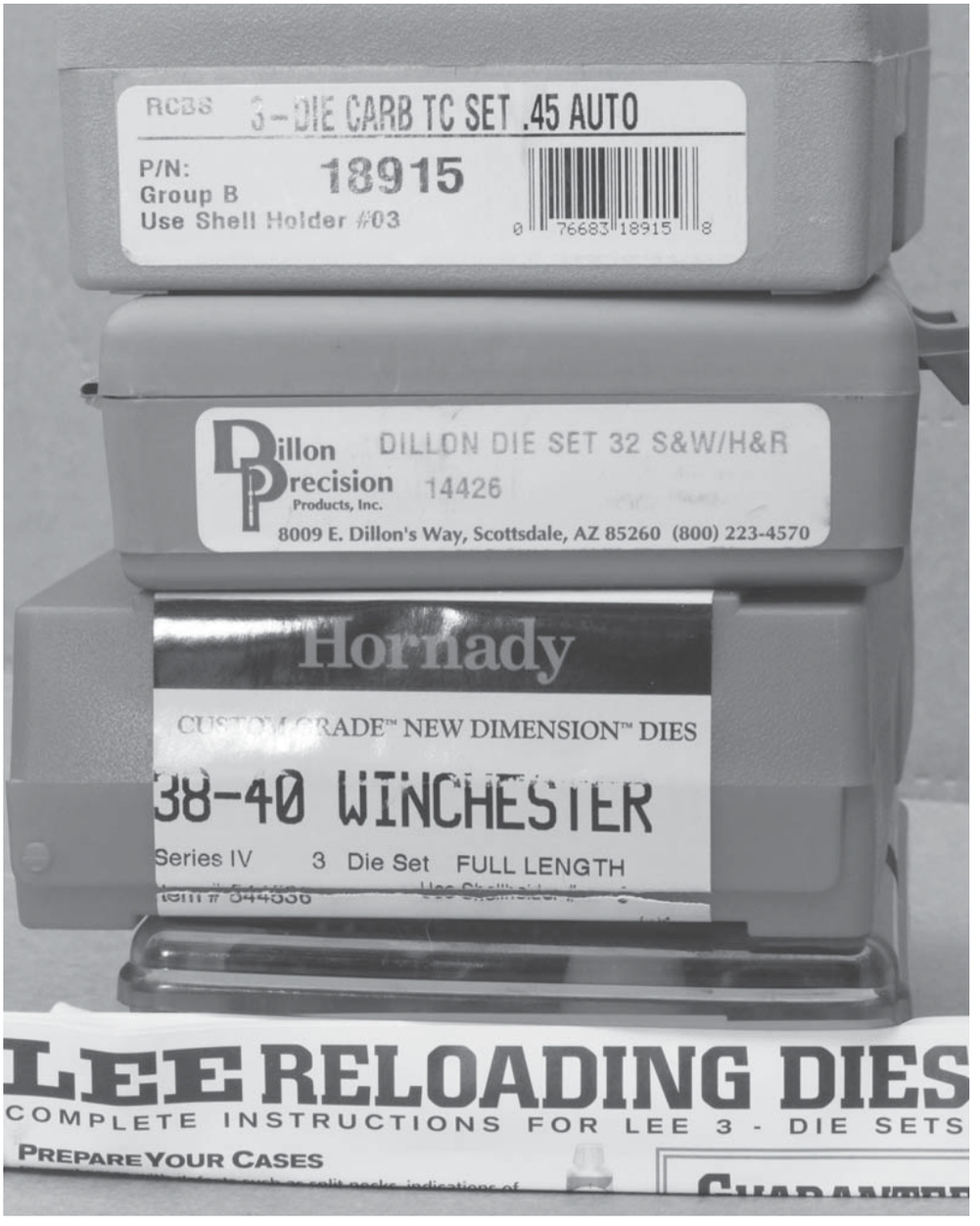
With all due respect to the writers of other reloading manuals, you don't get a whole lot of guidance on how to set up your reloading dies. To be told "screw them down until they touch the shell holder then back off a bit" isn't exactly helpful.

So, here's the process I use to set up dies for a new caliber. What you'll need are the dies and your press and, if you are loading on a progressive, whatever means of holding the dies the press requires. You'll need a loaded round of that caliber and a clean and empty case as well. Classic dies are three-die sets, meant for use in single-stage presses. You have the sizer, the belling die, and the seat and crimp die. Progressive presses have four or more stations, and there you have sizer, bell and powder drop (or bell and another station to drop powder) bullet seating, and then finally crimp. Presses with even more stations have them so reloaders can install a powder-check die, one that measures powder level to avoid low- or overcharged rounds.

I'll describe both sets, and where they differ.

SHELL HOLDER

Whatever your press uses, install the shell holder. If it is a progressive, adjust the shell holder so it moves smoothly but does not bobble or wiggle about. You don't want it so tight it is pinned down, but you don't want it moving, wobbling or vague in its location when on-station for a die, either.



All handgun dies have the same thread pitch and diameter, and will work in all presses.

SIZING

Run the press ram up to its full extension. Loosen the locking ring on the die all the way to the top, to keep it out of the way. Screw the sizing die down until it touches the shell plate, then back off a quarter-turn. Run the locking nut down to lock it in place. For straight-walled cases, you're done. For bottlenecked cartridges, you have to take a slightly different approach. If you just run the die down, you'll probably be setting back the shoulder too much, and case life will suffer, if your ammo works at all.

For bottlenecked cases, you'll need a case gauge. You'll lose some cases in the setup, but brass is cheap, relatively speaking. Set

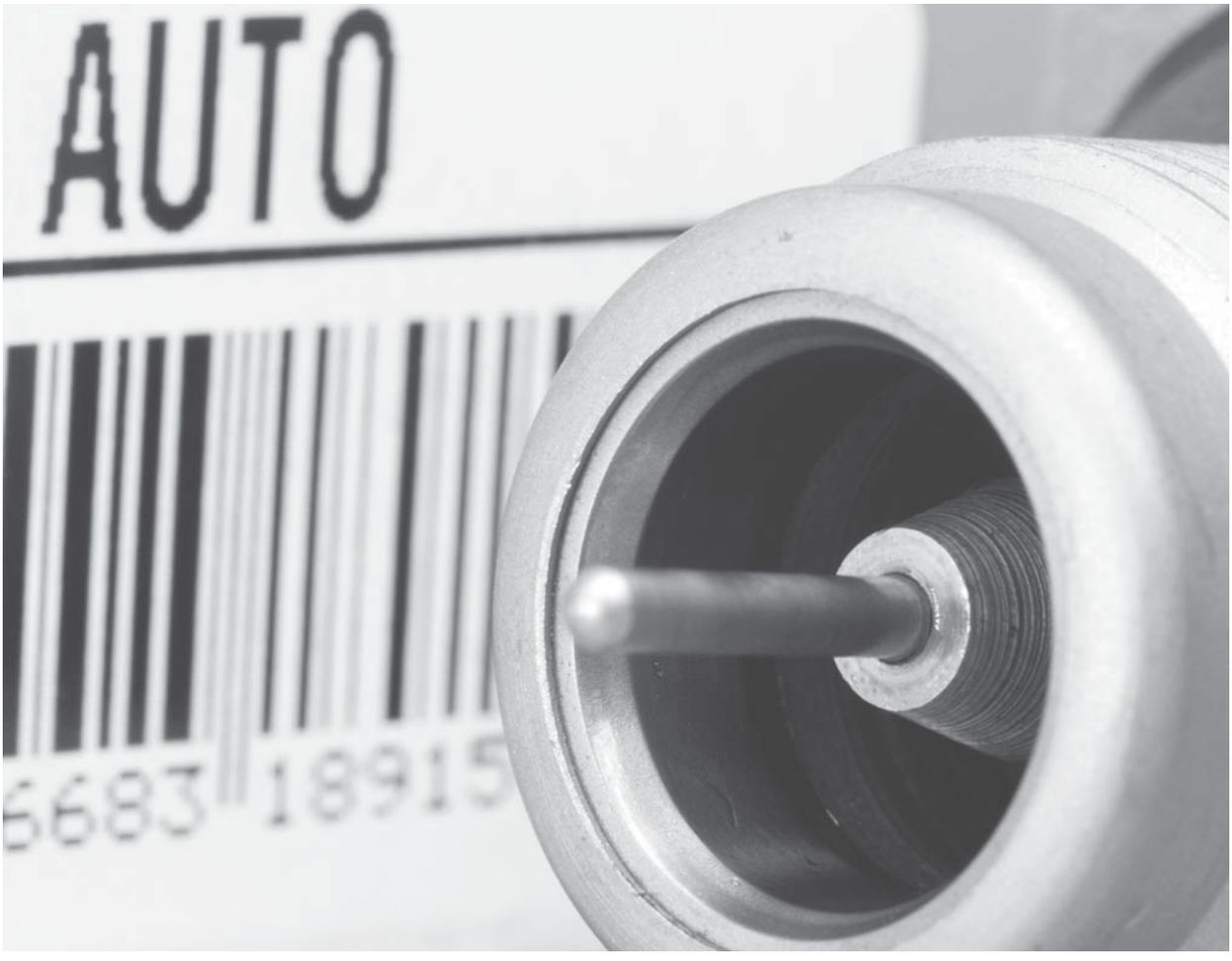
up your sizing die as above. Lube a case and run it into the die. Pull it out, clean it off and drop it into the gauge. Typically, it will drop below the minimum step on the gauge. Back your die out a full turn and size another case. Check it in the gauge.

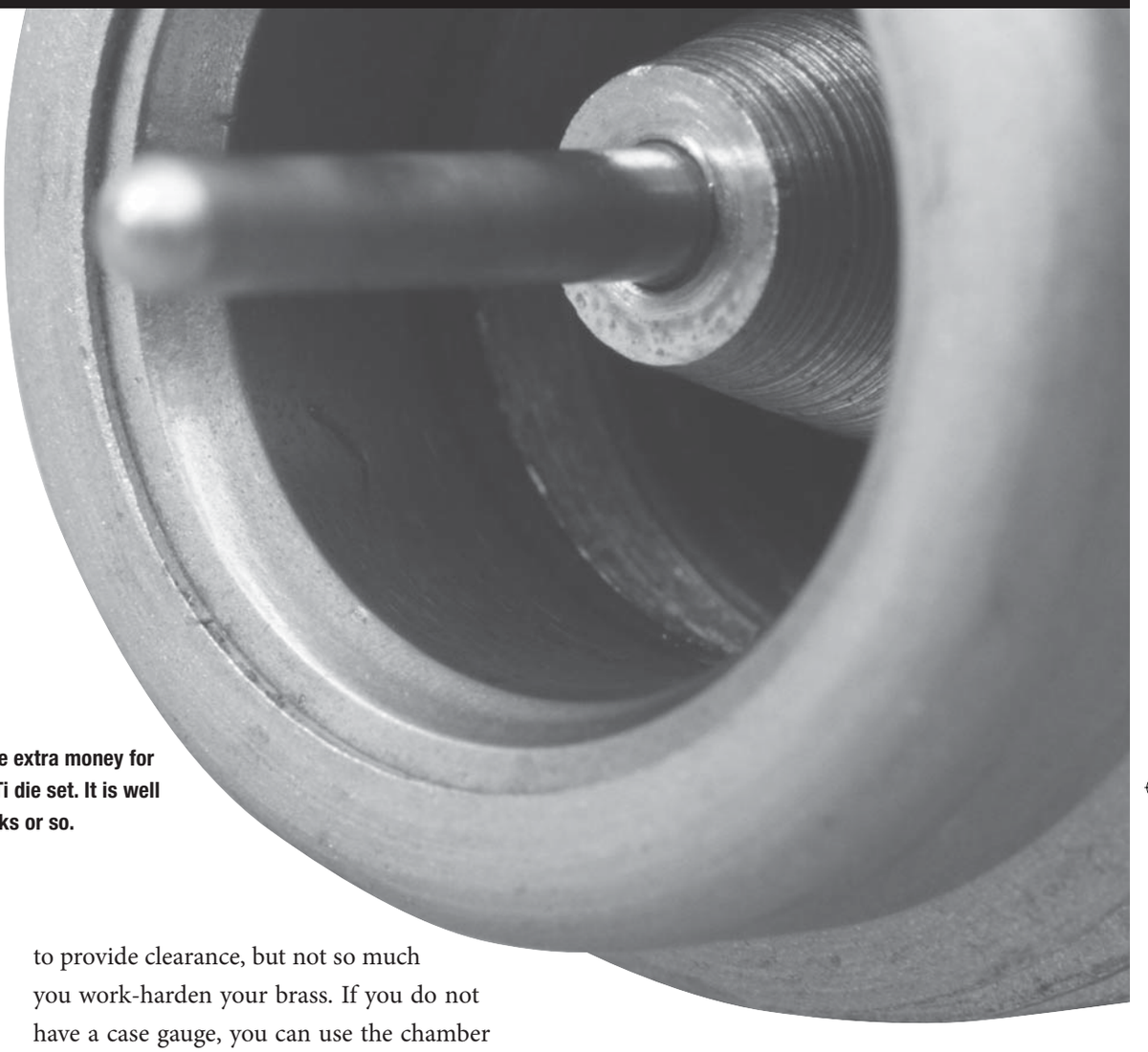
What you want is to not only size the case, but "bump" the shoulder back a few (very few) thousandths. If you leave it where it is from firing, you may not have complete closing of your action, despite the diameter of the case neck and body being squeezed down in reloading. You have two extremes here.

On cases like the .38-40 and .44-40, the case headspaces on the rim, and you might get away with shoving the shoulder all the way back. But eventually (and more likely, quickly) your cases will crack from over-work. You want to set the shoulder back enough to work in your revolver, but no more. If you have several revolvers in these calibers (oh, you masochist, you) you'll have to size your cases for the chamber/revolver with the shoulder the lowest. That means accepting shorter case life when used in the other revolvers.

The other is the .357 Sig. The high pressure of the Sig pushes the shoulder forward. If you don't bump it back, you may find your reloads wedged into the chamber, unable to fully close. You want to bump it back enough

There is very little interchangeability between dies and calibers. While a .38 Special set can also work in .357, a .45 ACP die set will not work on a .45 Colt.





If at all possible, pay the extra money for a carbide sizing die or Ti die set. It is well worth the extra ten bucks or so.

to provide clearance, but not so much you work-harden your brass. If you do not have a case gauge, you can use the chamber of your barrel (out of the pistol). It will not be as precise, but you'll be close enough to get started, and a few range sessions will tell you if you need to do some more fine-tuning.

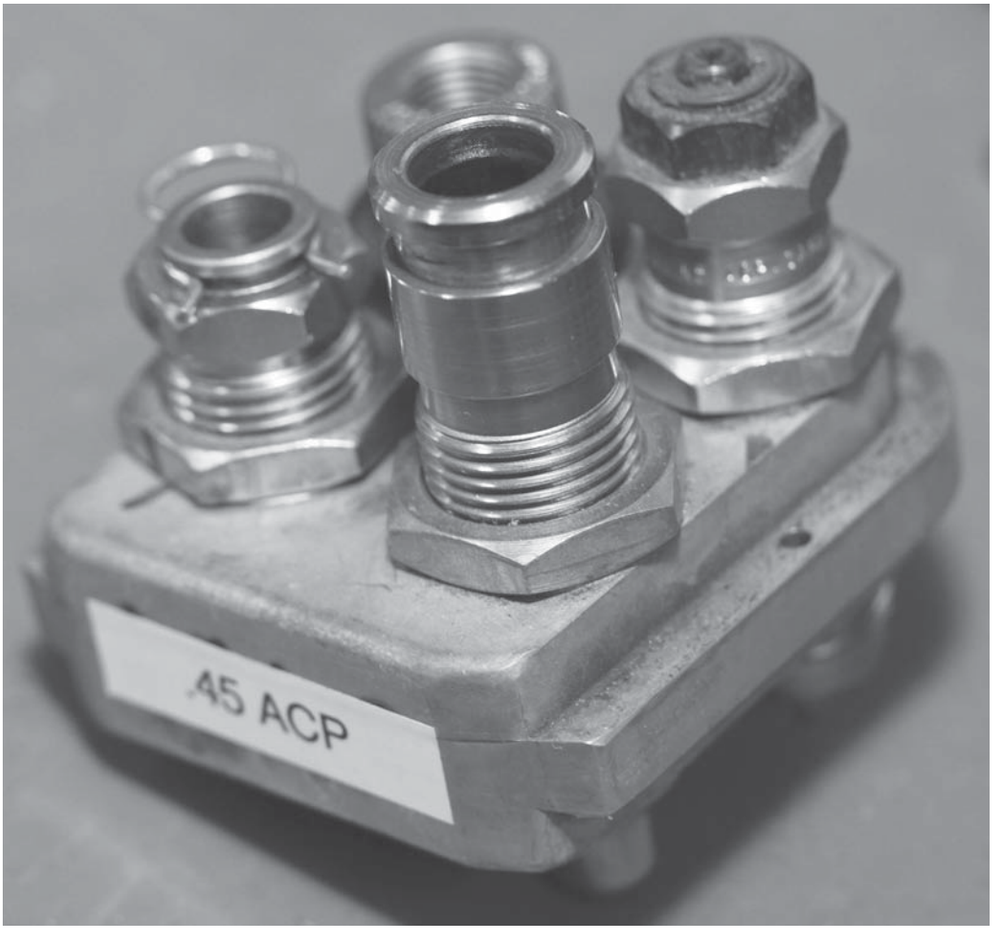
BELLING

Take your dial calipers or digital calipers and measure the distance from the full diameter of the belling tube to the belling taper. Close enough is good enough.

Take your empty case, put it at the belling station and run the press ram up. Screw the belling die in. On the Dillon dies, you'll have to hold a pencil or dowel in the top, to press the belling tube down. Screw the die down until you can feel the belling tube pressing into the case mouth.

Stop and measure the height of the die above the press head. Lower the press ram. Now, screw the die down the distance you measured to start, that being the length of the belling tube bell-to-taper.

At this point it will take a bit of trial and error. With the belling die in place, run the ram



Once properly set up, a die plate (this is a Dillon 550B) can be swapped in and out without having to be re-adjusted.

The Dillon press, showing the die plate opening.

The die plate, sliding in.

The locating pins. The die plate "floats" a bit, and is self-centering on the press head.

up and bell the case. Lower and remove. If the case is belled just right, lock things down. If not enough, screw the die in a bit, if too much, out a bit. Typically, flat-based bullets need more taper than boat-tail or beveled-base bullets, and swaged or cast lead needs more belling than jacketed bullets do.

Once you have it close enough, lock the locking ring down.

When you begin loading, watch the performance of your seated bullets. If you find that you are getting a small ring of lead or shavings of jacketing material at the mouth of the case in seated-bullet ammunition, you are not belling enough.

One big clue to over-belling (besides the trumpet-like look of the case mouth) is drag on the case when it goes up into the bullet seating die.

SEATING

First, the adjustments for a press that uses a seating-and-crimping die. Loosen the lock nut on the seater stem and run the stem up. Screw the seater die partway into the press. Put a loaded round on in the shell holder and run it up. Slowly screw the die down until you feel the crimp bevel beginning to rub the case mouth. Run the die locking ring down and snug it in place. You'll probably have to do a bit more fiddling as you fine-tune your ammo.

Now, run the seater stem down until it contacts the bullet. Snug the lock nut in place. Your die is now roughly adjusted for that factory load. The bullet seating is within a few thousandths, but the crimp will have to be fine-tuned.

Your belling adjustment and your crimp adjustment have to be tuned and adjusted in concert with each other. If you adjust the belling setting to bell the case mouth more, you have to check the crimp setting to ensure that you iron out the crimp, and no more or less.

You also have to account for changes in crimping, in your seating stem. If you need to administer, say, a quarter-turn more crimp, you should give your bullet seating stem a quarter turn out, so you do not add crimp and also shorten the overall length of the loaded round.

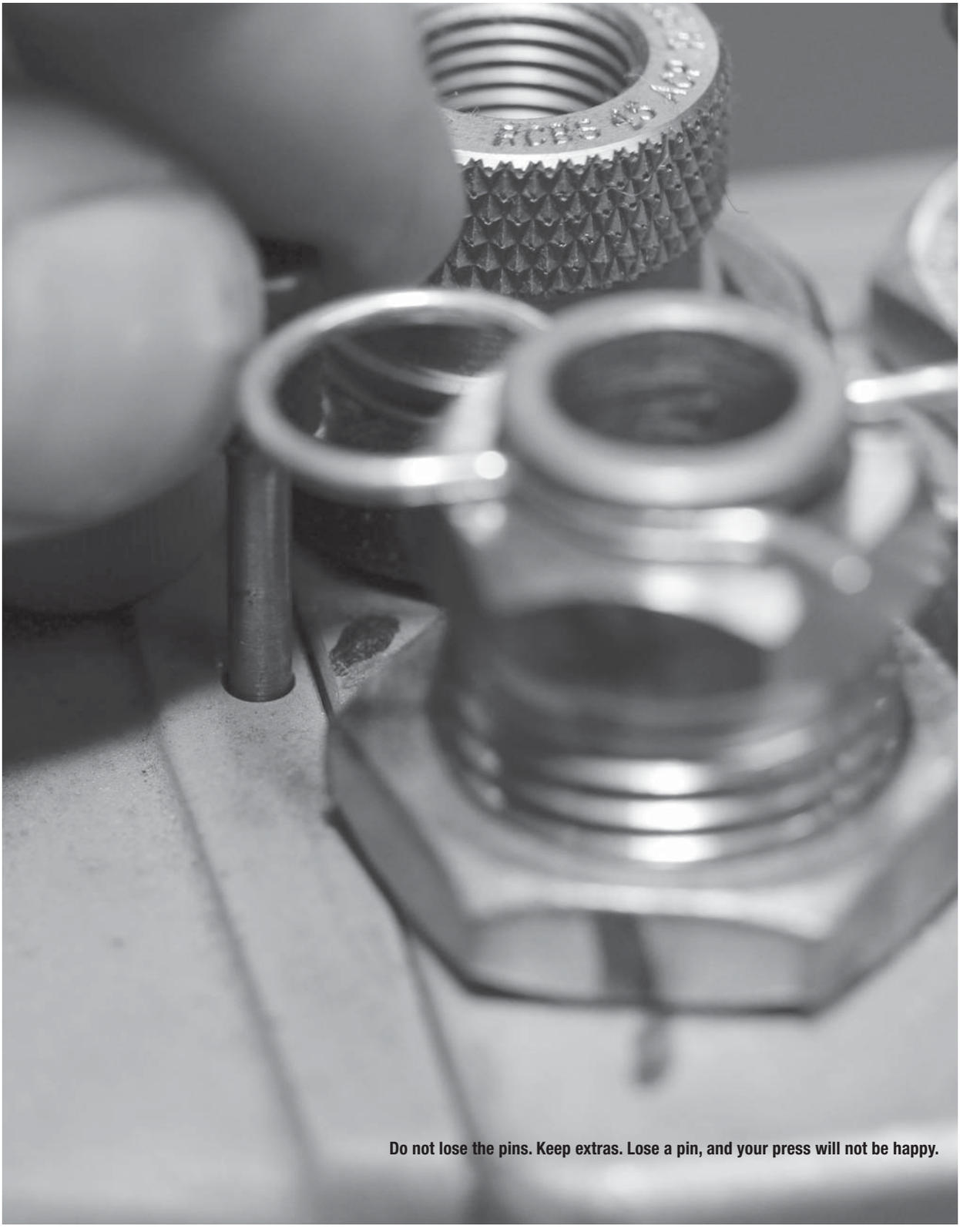
Seating for a two-die seat and crimp is easy: run your loaded round up, screw the seater die down and, once the seater comes in contact with the bullet, lock it in place. Fine-tune to adjust for belling settings and you're done. Follow the same process with the crimp die.

FINE-TUNING

Once you have your dies set up, you are not done. You have to fine-tune to your needs, your load and your firearm. To do this you'll have to load a test batch of ammo. Select a load from the loading data, one that is right in the middle of performance. You don't need or want a wimpy load or one at the max.

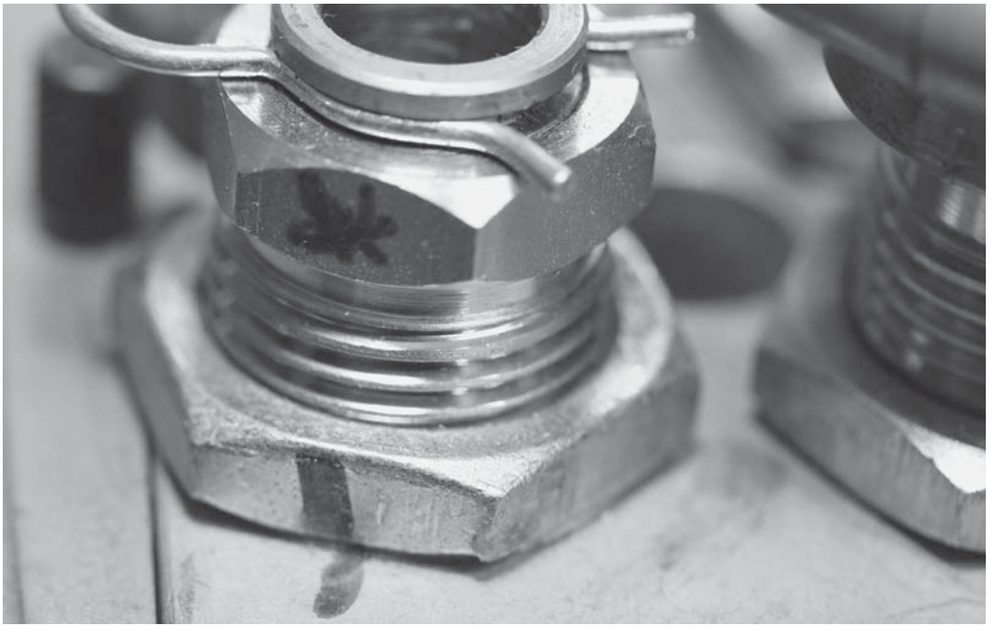
With your dies set as above, start loading. Go slowly and note what happens. Load a single cartridge around the stations. (If you have a single-stage press, load one round while swapping dies.) Are you seeing lube and lead being shaved off your lead bullets? Are there tiny little crescents of copper pushed up on the bullet when you seat? That indicates that your case mouth belling setting is a bit undersized.

Once the bullet is seated and crimped,



Do not lose the pins. Keep extras. Lose a pin, and your press will not be happy.

Yes, I label all my die plate assemblies, so I can keep them straight. And, I label all the shell plate boxes, too.



Once set up and adjusted, mark the location of each die in the plate assembly. If the marks don't line up, something has changed.

I also mark the end of the screw for my powder adjustment. That way I can mark in my loading logbook which setting I had, and come back to it quickly.

measure the crimp diameter. Does it match the listed diameter? If it is too large, or undersized, adjust. A too-large crimp (or uncrimped round) will drag on the chamber walls on feeding, and eventually one or more of them will fail to fully chamber.

A too-vigorous crimp will cut the plating on plated bullets and can distort lead or jacketed bullets, causing accuracy problems.

With one bullet loaded, and adjustments made, now load a box or so. That's all.

On your next range session, shoot your ammo. Take a box of factory ammo (of a close match to the load you're developing) and compare them. Does recoil, muzzle flash and distance and angle of ejection match? Is accuracy comparable?

Yes, we'd all like to set up the press and immediately begin loading buckets of ammo. But you have to make sure what you're loading works, and works properly, before you load up a five-gallon bucket of it. Ammo is easy to load. Bad ammo is difficult to dis-assemble.

If your neck expander is too large, you will have bullets that set back when you test them. A set-back bullet will spike pressures. If you're already beyond "mild" in pressure, the increase may be too much.

This case buckled because of too much mouth crimp.

Cracked cases, found in inspection prior to loading. These would not load well, and would shoot even more badly.

A mess from insufficient mouth belling.

These have opposing problems. The .38 Super got too much mouth expansion, and won't fit into the seater die. The .40 got too little, and the case mouth caught on the bullet seater die and crumpled.

MARKING

Once you have your dies properly set, fine-tuned and locked down, mark them. Take a felt-tip pen (the brand known as Sharpie works wonders here) and draw a line on the die body, across the lock ring, and onto the press head. Every time you go to load, look at that line. If it is intact, all lined up, nothing has changed. If, however, when you install the die the line does not line up, something has changed and you must investigate.

DIE MAINTENANCE

Most of your die maintenance will center around the bullet-seating die, and then mostly if you are loading lead bullets. You will find that the seating die will gradually gunk up with lube and lead shavings. If your belling is not sufficient, it will build up more quickly.

A pause here to point out again the need for recording detailed loading data. When you develop your load, you should note things such as overall length. If, in a later loading session, you measure your ammo and find that your ammo is now shorter than it was before, look to the gunked-up seating die.

An occasional die swabbing-out session will keep things running smoothly. The lube and lead combo may require an occasional assault with rubbing alcohol on a swab, or even a stiff bore brush. One way to make life easier here is with the Dillon bullet-seating die. I love and respect the makers of other dies, but here Big Blue has scored a coup. The seater die can be disassembled without removing it from its locked position. Pull the retaining clip and the seater core drops out. Push out the internal retaining pin and the two pieces come apart, If they are glued with lube, you can push them apart. You now can

This case had too little mouth expansion, and when the bullet was seated the case got mangled.

scrub the parts in rubbing alcohol, hot water, whatever you desire, dry them, reassemble and get back to work.

And, the seater core is two-headed – one end for round-nosed bullets, the other for semi-wadcutters. In typical Dillon fashion, the ends are machined so as to be the correct (or pretty close) setting from one to the other, when swapped.

WORN DIES

Back in the early days of IPSC, the common caliber was .45 ACP and the most common load was a 200 grain H&G #68, over 5.8 of WW-231. Some shooters used the same bullet, but lacking the bevel base, which weighted 185 grains. One day the best shooter at our club (then, he hadn't been until the better shooter moved away) was bragging on a bullet purchase. A truckload of 200s, because "the 185s don't shoot accurately."

Oops. A group of us had just also made a bulk purchase, and some of us had bought 185s. Some of us, self-identified as the Gang of Four, decided we had to know. So we pitched in and invested in a Ransom Rest. With a bit of work we learned how to use it and

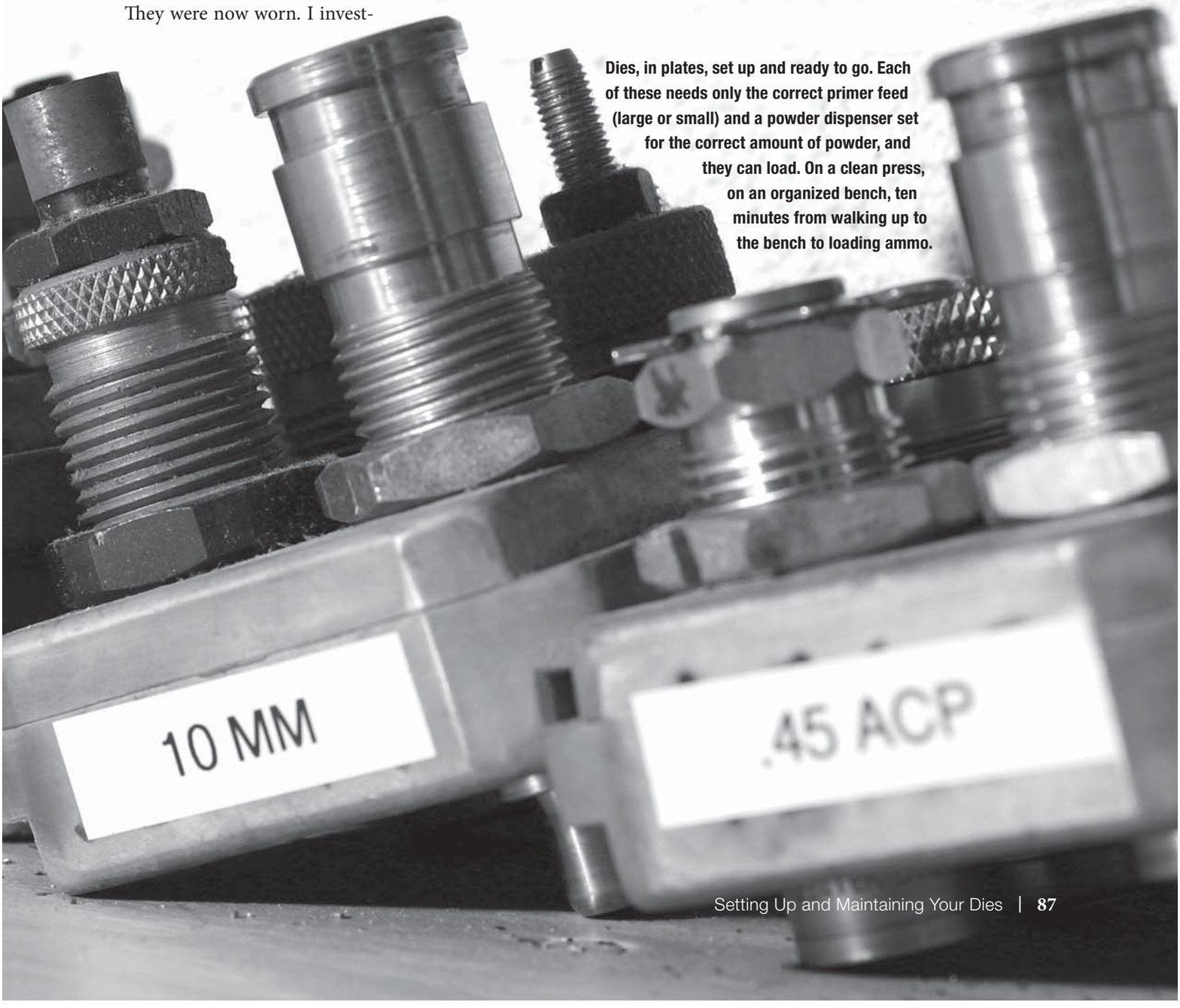
proceeded to test our ammo. What we found was interesting. On any given day, the 200s and the 185s were neck-and-neck, with one day one being better, and the next the other.

And our 1911s, also. However, one thing I did notice: almost regardless of which bullet, my ammunition was less accurate than the others. My gun, their gun, 200s, 185s, it didn't matter. It wasn't much, but it was noticeable. So I looked at my setup.

My downfall: I had bought cheap dies. (This was a purchase made in the 1970s, mind you.) They were now worn. I invested in modern, carbide dies, and my ammo immediately became as good as theirs.

Oh, and the best shooter? He and his shooting compatriot had loaded a small batch of 185s and shot a couple of groups, hand-held, over sandbags, compared to 200s. The 185 groups were a bit larger. Thus, "185s don't shoot accurately."

I still have the ransom Rest, and it has taught me a lot since then. One thing: don't be cheap on dies.



Dies, in plates, set up and ready to go. Each of these needs only the correct primer feed (large or small) and a powder dispenser set for the correct amount of powder, and they can load. On a clean press, on an organized bench, ten minutes from walking up to the bench to loading ammo.

Chapter Six:

STATISTICS

Mark Twain once observed "There are lies, damned lies, and statistics." With all due respect, it isn't statistics that hurt people, it is people who mis-use statistics who hurt themselves. Numbers matter, because numbers tell us how well, or even sometimes, what, we're doing. With no more intro, I'll jump right in, with explanations and descriptions.

Let's start with what you'll see on your chronograph.

AVERAGE (A)

The average is simple: add up the numbers, divide by the number of entries and, *voila`*, you have the average. The average velocity is simply that – add, divide, write down or print or read off the screen. You can have an average velocity where none of the recorded shots actually traveled that exact speed. Average is not the same as the mean or the median. They describe other measures of a group. All we're concerned with here is average, total divided by number of entries.

Average matters because we are trying to achieve a certain velocity, and the average is a measure of how close we've gotten.

EXTREME SPREAD (ES)

This is simply the number of units (feet per second, meters per second, parsecs per millennia) between the largest and the smallest recorded speeds. If you record two velocities, 700 fps and 800 fps, the average is 750 and the extreme spread (Es) is 100 fps.

The extreme spread tells us how far the

fastest and the slowest ones are apart and what spread there is across the average.

STANDARD DEVIATION (SD)

This one is a bit more complicated. It is, essentially, the measure of how variable a data set might be. An example: your 700/800 measure above, and another, of 650 fps and 850 fps. They both have an average of 750 fps. However, it is clear that one is not as good as the other, due to higher variation. (One has an Es of 100, the other an Es of 200.) The derivation of, and the use of, the standard deviation is a subject that consumes a lot of time in statistics classes, and discussions of it can approach religious levels.

To give you a visual, let's take the standard bell curve, you know, the one showing the distribution of just about everything. If the group has a sharp spike in the middle and the curves drop off quickly on both sides, that is a group (velocities, incomes, weights, it doesn't really matter what) that has a small standard deviation. If the same measure produces a curve with a lower peak, and curves that extend further off on the right and left, that is a group that has a larger standard deviation. The averages of each may be identical, but the high-sD group will have more of them further from that average.

The essence is this: two-thirds of the recorded velocities will be grouped within one standard deviation. Two-thirds of the remaining velocities will be within the next sD. Large sDs make ballisticians nervous. They know that if the sD is too large, the outliers, the slowest and the fastest, can get in dangerous territory. That is, if the variability of velocity (and the pressure that goes with it) are too great, you will eventually have a bullet stuck in the bore on the slow end, and/or a gun-busting pressure event on the top end.

For our purposes, a lower standard deviation as calculated by your chrono simply means that the velocities recorded are closer together (closer to the average, in velocity) than a group of shots with a higher sD. It, in and of itself, does not mean your load is more accurate, just that it is more regular.

COMPLICATING FACTOR

Average and extreme spread do not care, nor does it matter, how many samples you take. If you average two shots, the average is the average. Ditto extreme spread. However, to measure sD accurately, we need more – an absolute minimum of five shots, and more is better. A professional ballistician isn't even going to bother with data where the recorded sD is measured across less than ten shots. For him, the level of confidence is just not worth it for anything less. (More on that in a bit.)

However, for competition purposes, a low sD load is preferred to a high sD load, because of . . .

POWER FACTOR (PF)

PF is simple: the weight of the bullet (in grains) times the velocity (in feet per second). A 158 grain .357 Magnum bullet, going 1,000 fps, records a PF of 158,000. For ease of use, we simply round off and then drop the last three digits. And we thus have a 158 PF for that load.

Practical shooting competition requires

various Divisions to record a certain minimum PF, or your score suffers. Indeed, if your PF falls below the minimum for some, your score is zero. Power Factor is a momentum scale, not a kinetic energy (KE) scale. In KE, the weight is adjusted to mass and the velocity is squared. In the beginning of practical shooting it was possible for a light, fast bullet to post a KE the same as a big, heavy bullet at moderate speeds. This was counter to observed shootings, and thus momentum was selected as the measuring stick.

Also, momentum (PF) was easier to measure or calculate. The original measure was a ballistic pendulum, where your bullet's impact literally had to swing a weight as far as that day's standard load did, or be scored at a lesser rate.

When it comes to competition, a combination of heavy-for-caliber bullets will gain you the threshold of PF, at the lowest felt recoil. This explains 230 grain bullets in .45, 180 in 40 and 147 in 9mm.

A competition shooter desires a low-sD load, due to those wide outliers mentioned above. At the chrono stage, the guy running the chrono will select a mere handful of rounds (usually three). He will take the average of those three. If your load has too large an sD and you have not loaded it enough above the threshold for your PF needed, luck will have him selecting one or two very slow rounds.

(As a friend of mine remarks, "It isn't Murphy's suggestion, it is Murphy's law.")

You need wiggle room above the minimum PF. At every match someone will post a sign to record the PFs that came the closest – the closest to not passing, the closest while having barely passed. The smaller the sD, the more you can shave your load to pass the PF, to squeak past the minimum, and not be too overly-recoiling.

Does that matter? If you are competing to win at the highest level, everything matters. When the difference between first and second place is less than a percentage point, do you want to be shooting a 176 PF load, to your nearest competitors 168 PF load?

Now, the non-chrono items.

MOA

A minute of angle (MOA) is close to, but not exactly, an inch. A circle is 360 degrees of arc. In each degree there are sixty minutes of arc. So, a minute of angle is 1/21,600 of a complete circle. It happens to work out as 1.047 inches at 100 yards. As an angle, it is constant regardless of distance. A 1-MOA firearm will shoot (provided the shooter and conditions are up to the task) two inches at 200 yards, three inches at 300, and so on.

Clearly, at 25 yards (a common handgun distance), a 1-MOA firearm will shoot a 0.25-inch group. A handgun that will shoot two inches at 25 yards is an 8-MOA firearm, explaining why most hunters use rifles.

GRAIN

Not a granule, but a grain weight of powder. There are 7,000 grains in a pound, and once you know that, calculating load cost is easy. A load that requires 5.0 grains of powder will produce 1,400 loadings per pound of powder. Powder scales and charge charts commonly show or list weights by the tenth of a grain.

Multi-variable extrapolations or interpolations lead to busted guns.

EXTRAPOLATION

The "ex" word is where you project data beyond the measured or recorded set. If 4.0 grains of powder gets you 700 fps, and 5.0 grains of powder gets you 800, then you are extrapolating to predict that 6.0 grains will get you 900 fps. This is all fine, but if the published loading data stops at 5.0 grains, there is a reason, and maybe it doesn't get you 900 fps at all. Maybe what it gets you is 850 fps and a doubling of pressure.

Extrapolation in reloading is a dangerous proposition. You may calculate your leap to arrive someplace safe, but the world does not always (even rarely) care about the "correctness" of your calculations. It is what it is, and it may well be that 6.0 is not a safe load for that powder, that bullet, that caliber. Trust the printed load data.

INTERPOLATION

Here, you predict between data sets. As above, with 4.0/700 and 5.0/800, you can predict that 4.5 grains will get you 750 fps. Here, you are safe, with some exceptions.

A note to those who want to use this exciting new tool: you can extrapolate carefully, or interpolate with confidence, with one variable at a time. Multi-variable extrapolations or interpolations lead to busted guns. Don't change powder charges and powders (to the next one on the burn rate chart, for example), because you are changing too much and will find the results at least disappointing, and perhaps unsafe.

Now for some ballistics stats.

PSI

Pounds per square inch is exactly what it sounds like. Take a one-inch cube, stand on it, and your weight is the PSI the cube exerts on the floor (and your shoe/foot).

CUP

Copper units of pressure is a measure of pressure used before electronics. Basically, it's the pressure required to squish a small copper cylinder a measured amount. Each production lot of copper crushers, as they were called, was tested and came with its own pressure scale.

LUP

Lead crushers, as above, were used to measure pressures (typically shotgun) that were too low to accurately be recorded with copper crushers.

MAP

Maximum average pressure (MAP) is what they call it. Measuring pressure, the average pressures of a series of test shots. Just as with velocity, you could measure a series of shots and come up with an average that none of them actually demonstrated.

And, as with the velocity measurement, the pressure series produces a standard deviation. If the sD of the recorded MAP is too high, then the load is either adjusted or discarded. And this is for the same reason the practical shooting competitor desired a low sD in his/her load: if the pressure sD is too high, there will be (given enough shots) a round that grossly exceeds the allowed maximum.

This is the main reason you'll see data with pressures listed, where (just to pick some numbers) the maximum allowed pressure of a cartridge is 30,000 psi, but the particular load data stops short at 25,000 psi. The extra 5,000 psi is the wiggle room for the statistical variance that will produce, sooner or later, a 29,000 psi load. Otherwise, if they loaded right up to 30,000, the statistical variance would eventually produce a 35,000 psi event, a bad thing.

LEVEL OF CONFIDENCE

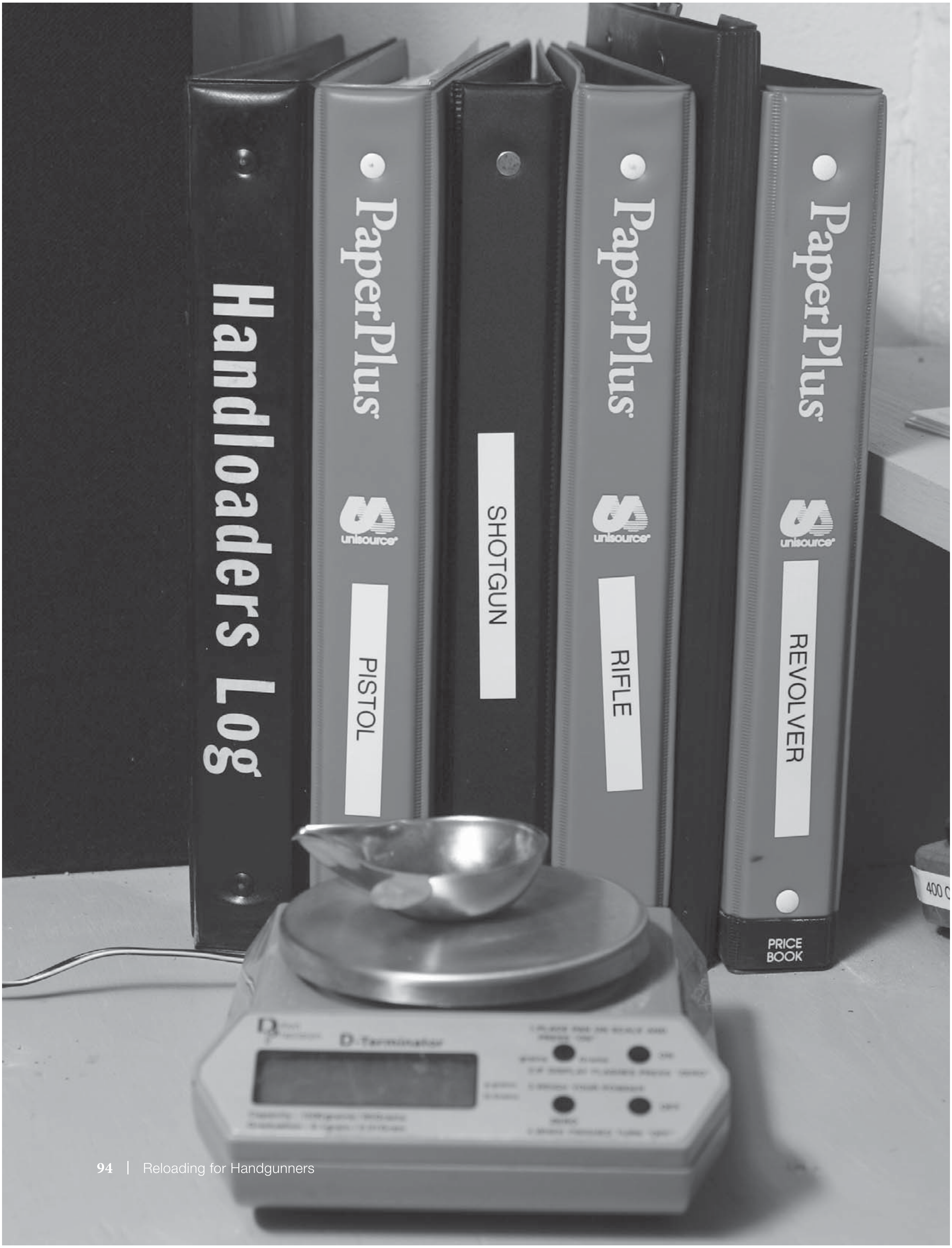
Another near-religious calculation. Okay, let's take a train car full of ammo. We pull out a box, remove five rounds, and run them over the chrono. We get an average velocity of 900 fps. Question: Is that the average velocity for the rest of the ammo in the box? The train car? The answer: yes and no. We know for certain that the average of those five rounds is 900 fps.

To know the true average for the rest of the box, indeed the rest of the train car, we'd have to shoot and measure them all.

Which defeats the purpose of chrono-ing five rounds. If we run them all over the chrono, we don't have any left to practice with, nor to compete/hunt/carry for defense.

If we shoot five, we have a certain level of confidence that the other 45 in the box will have an average very close to the one we measured. Less so for the whole car full. However, we can chrono enough of them and calculate the level of confidence we have that the rest will perform similarly.

If you were to actually take a train car load of ammo (several million rounds of ammo, at least) and chrono only five rounds as your "sample," no statistician worth his salt would even talk to you. However, for the purposes of our work here, where you'll be loading hundreds of rounds and measuring five or ten in each batch, your level of confidence, statistically speaking, will be quite high.



Chapter Seven:

LOAD DEVELOPMENT & TESTING

Okay, you've got the gear, the components, and a handgun you want to load for. Now what? Simple, you go one step at a time.

STEP 1

Select a likely load. If you have particular components in mind, then check the load data here. If it isn't listed, then find a loading manual that does list it.

Loading manuals have been produced for a century now. You can find just about any loading data you want, if you are willing to "mine" the available information. This is both good and bad. For instance, I can dredge up loading data for powders that haven't been produced since the Great Depression. You can find info on bullets that went out of fashion before the disco era. And, you can find all sorts of enthusiastic, optimistic and even hair-raising data if you try. I'd suggest that you look in the biggest names and see if they have the info you want for the application you're looking for.

Consult the load data and select a starting powder charge below the middle of the range. Load a handful of rounds to that load spec, and keep them separate from your ammo for the next range trip.

At the range, load the rounds and shoot from a solid rest. Check accuracy. If you have a chronograph, run them over the chrono, and check against what the book says.

You must write things down. If you don't, you'll never remember things correctly and will always be re-doing your loading experimentation. And, busting guns from time to time.

Data production

A quick aside here, on the nature of information. There are two broad groups of people who produce reloading data for your use: bullet makers and powder makers. Both have limits on their time and budget. They will not, however, limit themselves on their own product.

Let's take, for example, a powder maker. They will generate and publish data for all their commercial, canister-grade powders. They'll do so in all the calibers they can be sure of working properly. Now, just because powder maker "A" doesn't list their "#1" powder for the French 1873 11mm ordnance revolver doesn't automatically mean it won't work. (It probably won't, but stick with me here.) They probably made the decision for economic reasons. First, darned few of us even have such revolvers and the time spent would be better put to use on other calibers. And second, pressure barrels cost money. A lot of money.

If, however, "A" doesn't list their "#1" powder in a common caliber, there's probably a very good reason. Don't go assuming they were lazy or ran out of time. They most likely found that, for reasons known only to the powder, it just doesn't like that caliber.

I ran into this with the 10mm. My customer developed a load and blew a case. He asked me to look into it. Instead of ringing up the powder company, I reviewed the loading data (noting that the powder company didn't list that particular powder in their 10mm data) and did some calculations. His charge was within the calculated range of similar-burning powders and bullet weights. Similar powders were listed and worked just fine.

So I went ahead and loaded some myself. I even went so far as to weight the charges individually. You guessed it, I blew a case. I also had extreme spreads (I chrono'd the ammo as I fired the rounds) that were eye-opening. As in, an average of 700 fps, with an extreme spread (granted, only five rounds chrono'd before things went kerflooey) of 350 fps!

When I got home I phoned the powder company. "I'm having some extreme results in 10mm loading," I said to the ballistician. His reply was, "Let me guess, you're using our XYZ powder, right?" There was a reason they didn't list the powder; it wasn't at all happy in the 10mm.

Similarly, if a bullet maker doesn't show a particular bullet they make in a given caliber, there's a reason.

No one can try all bullets, from all sources, in all similar calibers with all powders. There isn't the time nor budget. But, the powder maker will test common bullets with all their powders, in all suitable calibers. The bullet maker will test all of their bullets in suitable caliber, and use common powders to do it.

So, if you are sitting on a warehouse full of #1 powder but cannot find loading data for the .30-.357 Super Mag, it may be because only you and five other guys have handguns in that caliber. Or, it may be that #1 and the Super mag don't play well with each other. Email the powder company and ask.

Don't just find the closest powder in the burn-rate chart and the nearest similar cartridge and figure you'll "work it out from there." That's a good way to break a gun, and risk hurting yourself.

STEP 2

If you are loading for a particular accuracy standard or you need a particular power factor, then you need to load a variety. Take a plastic parts box and use it as your test-load box.

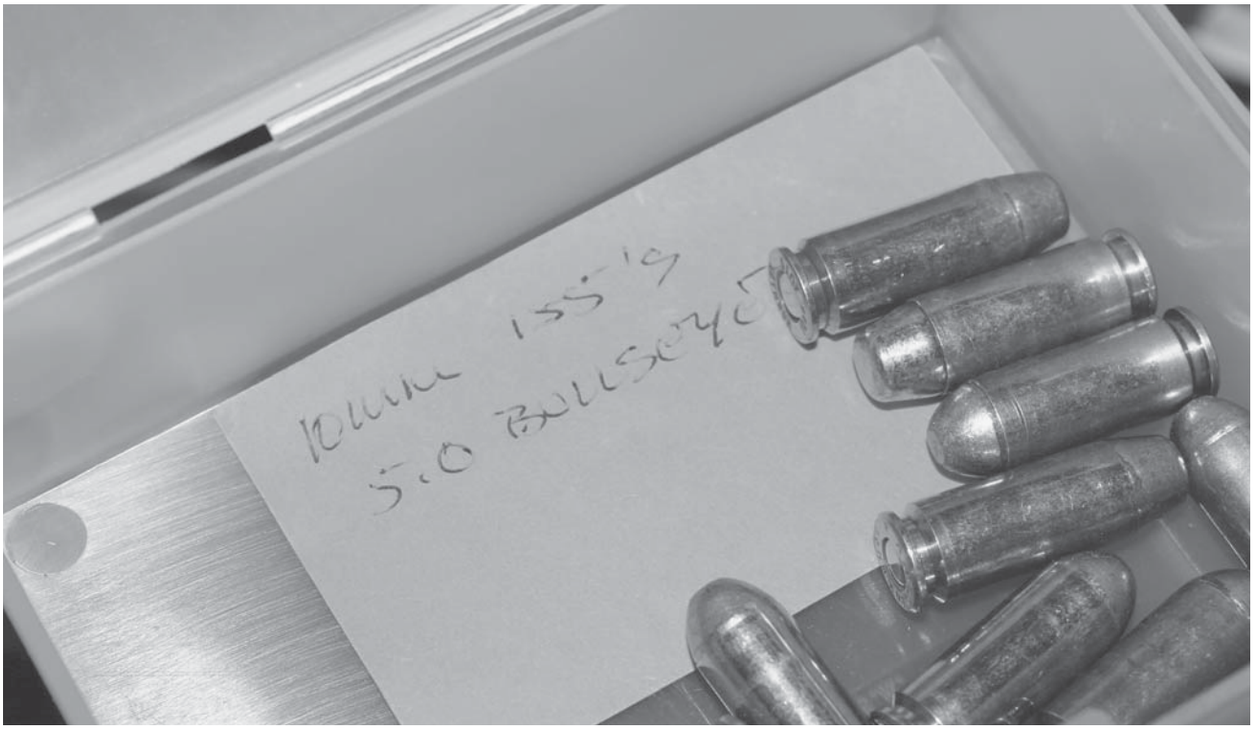
Load more of the one you just did. Put them into one tray of the parts box with a label. Now, bump up your powder measure. If you're loading under ten grains of powder, bump it up a tenth of a grain. So, if the first load was 5.5 grains, you load 5.6. And 5.7, and 5.8. You want to have a spread of loads starting at the halfway point, but below the maximum listed for your particular caliber and bullet weight.

Take them to the range and shoot for velocity and group. Velocity testing will be a lot easier. Simply record the velocities of each batch, and if you need to exceed a particular power factor, calculate your needs. Or plot them on a graph.

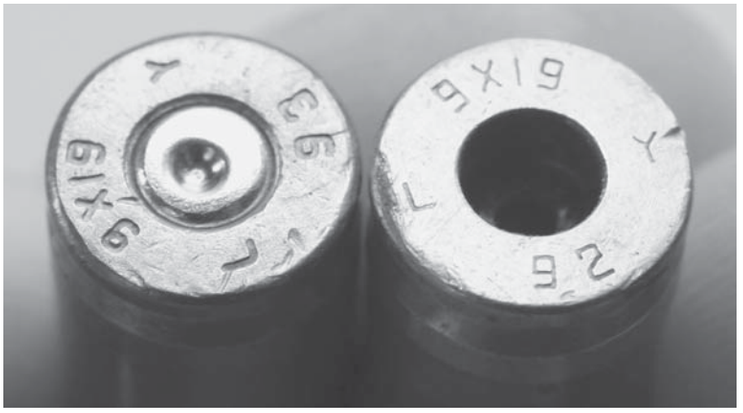
Accuracy will be more difficult, as the differences between particular powder charges as far as accuracy goes may be smaller than the skill level of your shooting. Not to be condescending, but if your shooting skills allow you to shoot groups that are three to four inches in size at 25 yards, trying to sort out powder charges that may or may not vary by half an inch in their performance is a fool's quest.

If you're really serious about accuracy you'll have to enlist the aid of a shooting machine such as a Ransom rest or a Caldwell hammer.

Things to keep track of besides the velocity are the extreme spread and the standard deviation. Now, the sD is an interesting note, but not indicative of a whole lot. There are all manner of accurate, reliable loads that have large sDs. Smaller is better, but if two loads produce equal velocities and shoot as accurately and cleanly, then the sD is not a big deal.



When you go to the range to test, label each batch. It can be as simple as a handful of rounds in a plastic box, with a small note.



Inspect, inspect, inspect. This egregious Chinese crap brass was/is so soft, it loses primers after three mild loadings.

You need one of these for each caliber you load. They are caliber-specific.

But a load with a large extreme spread is not a good one. That is a clear indication that there is some imbalance between the powder charge, bullet weight and case capacity. Avoid loads that have a large Es.

STEP 3

Use your parts box to feed the handgun you are testing, and note the velocities (and accuracy, if you're also doing that) as you use the ammo. Take notes at the range.

Record your results in a permanent log book of some kind. There is no point in developing more than one load, if you try to depend on your memory to recall which is which. You've gone to the trouble to find what works and what delivers the goods. Write it down.

I use loose leaf binders and dividers by caliber. Some pages are simply the notes of the range days (the powder used, amount, bullet weight, and velocity). If I need to know a particular combo, I'll skim the one I'm starting with, powder, bullet, etc.

Other pages are on a specific detail. For instance, I'll have a .45 ACP WW231 and 200 L-SWC page, because that was the classic IPSC load for a decade or more.

The organizational method you use simply has to be one you understand, If you can't find stuff, even when you only have ten pages, you need another system. But, if you have half a dozen binders and can find whatever you need to, your system works.

Your loaded ammo should go through a case-checker. This is simply a steel or aluminum cylinder with a minimum-dimension chamber reamed in it. Drop fully in, and drop out? It passes. If not, something's wrong.

STEP 4

Now that you have one bullet (in one weight) and powder that work, you have to decide: Do you rest on your laurels, or do you press on as a reloader? What options do you have?

4a: Light loads

Light loads. How light a bullet, with how miserly a powder charge, can you get good results, to introduce new shooters or just making your own shooting fun? This could be making a 9mm load with a 125 grain lead bullet that runs reliably at 800 fps. Hand that to a new shooter and they will find little to complain about.

In .38 Special, it would be a 148 grain wadcutter at 700 fps. Or, if you are looking to improve your big-bore double action shooting, load 180 grain bullets in .44 Magnum cases (or Specials, if you have them and want to keep things separated) and shoot those at 700 fps. You'll find it a lot more enjoyable (and better for your skill-building) to be shooting those, rather than 240s at 1200 fps.

What you have to keep in mind are the limits of light loads. It is better to go lighter in weight and lead than try to go "softy" with jacketed full-weight bullets. Lead bullets have less friction in the bore. Light weights mean less recoil, right from the get-go.

Trying to push a jacketed bullet slowly risks lodging a bullet in the bore. The one that follows it will end up bulging your barrel, and you'll have to get a new one.

So, rather than try to shoot 158 grain jacketed softpoints out of your .357 at low velocities (besides the added expense) you'd be better off finding 125 grain lead round-nosed bullets to load in it.

4b: Power

Now on this you want to avoid over-working things. A too-powerful load will bend or break things, wear your handgun faster than normal, and you even risk blowing it

If you want to do a lot of testing or experimenting, then a log book and numbered bins in a heavy-duty plastic tray will keep your batches separate but available.

up. Go to slower-burning powders. Watch for difficult extraction. If you can normally just thumb the empties out of your revolver and with your new "hunting" load you have to punch the ejector rod against the loading bench to get them out, the revolver is trying to tell you something: You've gone too far.

In pistols, heavier than normal recoil, or ejection that is brisker than expected, are signs of excessive pressure.

4c: Specialty loads

When I was shooting IPSC in the early days, we loaded lead bullets for practice and outdoors matches, and jacketed bullets for indoor matches and bowling pin shooting. I decided to take up PPC shooting, for winter practice and skills building. Except, they required lead bullets only on their traditional-style (read "antiquated," even by the lax standards of the 1980s) range. So, I developed the lowest-recoil lead bullet .45 ACP loads I could. Which, given the standards of PPC, seemed like Magnums to the other shooters.

The other extreme would be going to a plated bullet for use on an indoor range that is working to minimize lead exposure.

If you are shooting on steel plates and need low recoil but fast times to the plate, you'd want to load the lightest jacketed bullet at the highest velocity possible. On some competitive events where the stop plate (and not the sound of the shot) stopped the clock, I have loaded 90 grain fmj bullets, meant for the .380, into 9mm or .38 Super. A 90 grain bullet at 1400 fps (still a 126 PF) gets to the plate a lot faster than a 125 at 1,000 fps.

For bowling pin shooting in the Space Gun event, we'd go the opposite: loading 147 grain jhps into .38 Super cases and shoving pins off the table as fast as possible.

STEP 5

Volume. Once you've gotten a load tuned, you have the velocity and accuracy you want, it runs reliably, and you have all the details of primers, crimp, etc. nailed down, you want buckets of ammo. This requires two things: bulk purchase and a slightly different tracing process. You'll now buy your bullets in as big a lot as you can haul, ship or afford shipping. Ditto powder and primers, to reduce the per-box cost of the HazMat charge you'll pay on each shipment. HazMat, you ask? Simple, the DOT has required Hazardous Materials charges on powder and primer, since (shock, horror, alarm, surprise!) they burn.

If you order a single sleeve of primers, 100 of them, or a one-pound can of powder, you pay the $20 (last I saw) HazMat charge. If you order 10,000 primers, or 100 pounds of powder, you pay the $20 Hazmat charge. Now, there are limits in how much the shipping company will handle and how much the local fire marshal will allow you to store. But you pay the twenty bucks each time

As for tracking, you now have to keep track of buckets of ammo. If you literally load into five-gallon buckets, good for you. Me, I use large plastic storage bins. When they get an evening's or weekend's worth of reloading production poured into them, I'll note on a 3x5 card the relevant details. Bullet weight and maker. (All 230 grain, lead cast bullets for .45 ACP look alike, once they are in ammo. It would be good to know which brand they are.) Powder, and even lot number. Primers. If I'm loading it for a particular match, I'll include the date or dates loaded.

These are the same things an ammunition plant does, and for the same reasons: down the road, you may have experimented with four or five different, similar-appearing bullets. If the bucket you're shooting from is so good, you'll want to duplicate it exactly.

One bullet/powder/ caliber combo per bin, and you can chrono a dozen iterations per container.

Chapter Eight:

PRIMERS

Do primers really matter? The short answer: yes and no. If you are using vanilla-plain loads, something in the middle of the range of powder weight and burn rate, in the middle of the pressure range, in the middle or standard bullet weight, no. It doesn't matter one whit.

The usual reason given to pay attention to primers is "pressure control." As in, if you change primer brands you may add several thousand psi to your pressure or, just as likely, lose several thousand psi, and that could get you in trouble.

Let's take as an example the .45 ACP, with a bog-standard load, a lead 200 grain semi-wadcutter. Let's borrow from our good friends at Hodgdon and use their loading data chart, where we use a dollop of 700X in the amount of 4.6 grains. That gets us 821 fps, which is right on the cusp of making Major. The listed pressure is 12,100 CUP, which we can't translate directly to psi, but is 5,000 under the max CUP for the .45 ACP. In this instance, who cares if changing primers adds a couple of thousand CUP to the maximum pressure? If anything, it might make the 700X burn a little cleaner.

Now, let's up the ante. We use the same bullet, but we load for some performance, such as blasting bowling pins. We want some 950+ fps here, so we go to a slower-burning powder. We settle on SR-4756, where 8.2 grains nets us 966 fps. If we change primers to one that boosts pressure, we go from 17.1K CUP

to 19,100 CUP, which is over max of the .45 ACP but well under the .45 ACP+P pressure ceiling.

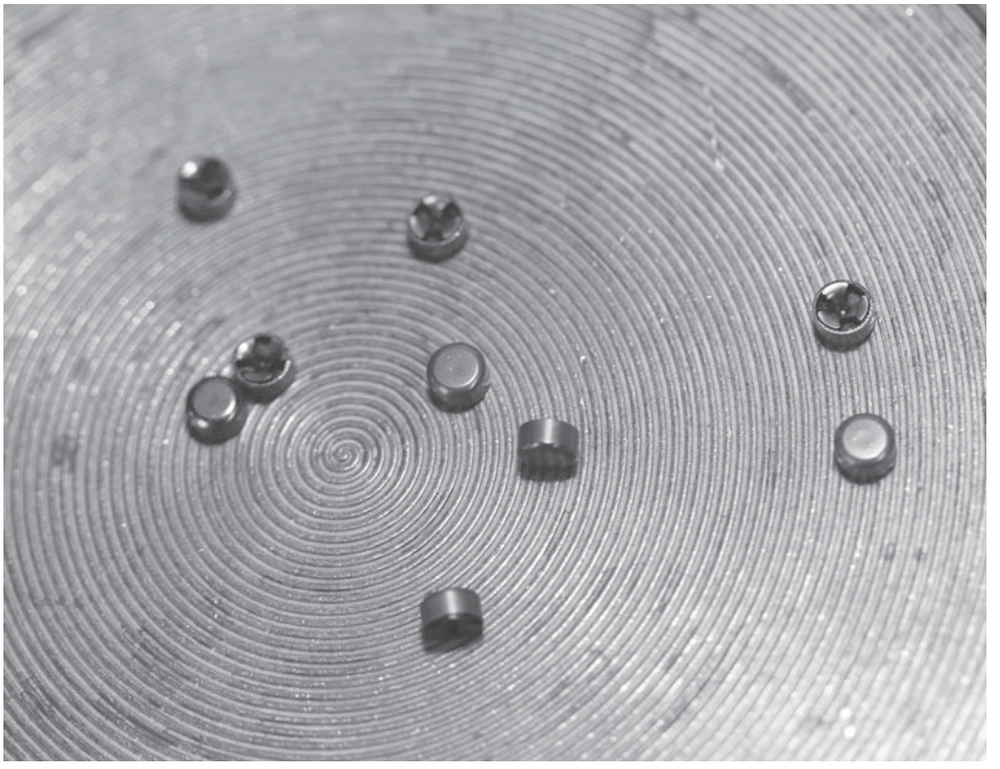
So, as long as you stay in the middle (at least here, in our .45 ACP example) you can't get in trouble with changing primers.

So, when does it matter? For one, it can matter in accuracy. Here you run into an individual preference, where a particular handgun shoots a given load accurately with a given primer. Or, more accurately, with one brand than with others. There is no way to predict such a situation. If you stumble upon one (say, your 9mm Steel gun shoots fantastic groups with a bullet/powder combo driven by the XYZ primer) then you just accept it and stick with it.

Another situation is where you have pushed performance right to the red line. Let's take a different example.

We'll load a .44 Magnum up to the max, for hunting. We take a Nosler 240 grain JHP bullet and load it over Hodgdon Longshot. (Again, I am looking directly at the Hodgdon data on this.) They show the 240 maxing out at 1331 fps over 12.1 grains of Longshot, at 34,500 psi. They do not mention the primer, but let's assume, just for the sake of our thought-experiment, that changing to a different primer can increase or decrease the pressure by 2,000 psi. Do we really want to be using something that has a Maximum Average Pressure of 36,500 psi? Remember from our statistics chapter, the average means some (generally half) of them will be less, but half will be greater. Thus it is entirely possible that our new combo can have one round in a box that generate 38,000 psi, and one in a hundred that generates 40,000 psi.

So, when you get close to the red line, pay



To load up your feed system, start by dumping primers into the flip tray, the one with the ribs.

Gently slide the tray back and forth until all the primers are anvil-side up

There's always one obstinate little so-and-so.

attention to what happens to pressure signs (if you can see any beside sticky extraction) and don't go switching primers "because these are cheaper" or some other non-essential reason.

PRIMERS AND "PRESSURE CONTROL"

We discuss it some in the 9mm section, but it is *en vogue* in some circles to replace small pistol primers with small rifle primers in top-pressure loads. The idea is that the "harder" rifle primers will "control" pressure by not showing any of the usual signs of pressure. You know, flattened, ridged or ugly primers after being shot.

This is a bad idea. It is bad for several reasons. First, the rifle primer, if it is indeed different from the small pistol primer, is so because of what is expected of it. It is expected that the small rifle primer will ignite much larger amounts of powder. As in two to three times the mass, and of a much slower-burning powder to boot. Primer strength is referred to as its "brisance" or ignition speed or shattering power. Think of a campfire. Do you really want to use an igniter meant for multi-pound chunks of firewood to ignite a few ounces of kindling? No.

So why use a primer intended to ignite 25-30 grains of slow rifle powder, in a case holding eight grains of quick (relatively speaking, in this instance) pistol powder? Answer: you don't.

Plus, the small rifle primer doesn't really "control" pressure, it just hides the signs. What you have done, in essence, is taken a car with rusty rocker panels, sanded that area smooth, and over-sprayed the sanded area. The rust is still there. The rocker panels (those are the sections underneath the doors, but visible from the sides) are still rusting, and the paint hasn't "controlled" the rust, merely hidden it.

So, handgun cartridges get handgun primers. And if the primer is telling you "don't do that," then don't do that.

What are we trying to do here?

Before we get deeper into primer feeding and seating, let's go over just what you're trying to do here. Each primer is a cup, a pinch of the active priming compound, a foil cover, and a small triangular gizmo called an anvil. The anvil is what squeezes the priming compound and sets it off. The priming compound is commonly composed of lead styphnate (pronounced styfe-nate) and it is an impact-sensitive chemical. To be safe, your primers must be seated in the primer pocket so the primer is flush or below flush with the case head.

If it is too high, it will tie up or stop the rotation of a revolver, and in a pistol can prevent full closure of the slide to barrel or even be ignited by the impact of the slide, setting things off too early.

So, flush or below it is. And actually, the factory has a specified location: below flush, with the anvil ever so gently compressing the priming compound. That maximizes the sensitivity of the primer, and a sensitive primer ignites quickly and also uniformly. Erratic ignition is a subtle source of inaccurate ammo, and thus it is important if you are worried about maximum accuracy to get them seated uniformly.

Uniformity is so important that those seeking the most-accurate ammunition will hand-seat primers even when they load on a progressive press. Additionally, revolver shooters who have tuned their trigger pulls (double action) to be as light as possible will use hand-seated primers to take advantage of the increased sensitivity of the correctly-stressed primers.

Now, as with all things, too much of a good thing can be bad. If you seat the primers too deeply, you can crack or break apart the pellet of priming compound.

The priming compound was inserted in the cup while the compound was still damp. This is done so both because it is a whole lot safer (wet compound is far, far less likely to detonate) and it is a convenient way to install the compound. Basically, the worker takes a small amount of wet compound, slaps it on a flat plate with tiny holes in it, and with a squeegee swipes the compound across the plate, filling the holes. The plate then gets married to another plate holding the cups, and the compound is pressed from plate to cup. Then they get the little foil seal, and finally the anvil. Once dry, the compound is a solid little pellet inside the cup, conforming to the cup dimensions.

If you over-seat the primer and crack the pellet, the primer becomes much less sensitive to impact and you can get erratic ignition. So, more is good until it isn't.

So, when does it matter? For one, it can matter in accuracy.

DANCE OF THE PRIMERS

The little circular spark plugs of your ammunition have to have the expired ones removed and fresh ones installed, or your ammo will not work. Once you've selected the correct/appropriate ones, you have to install them. How to do that? Relatively easy, if fussy and unforgiving.

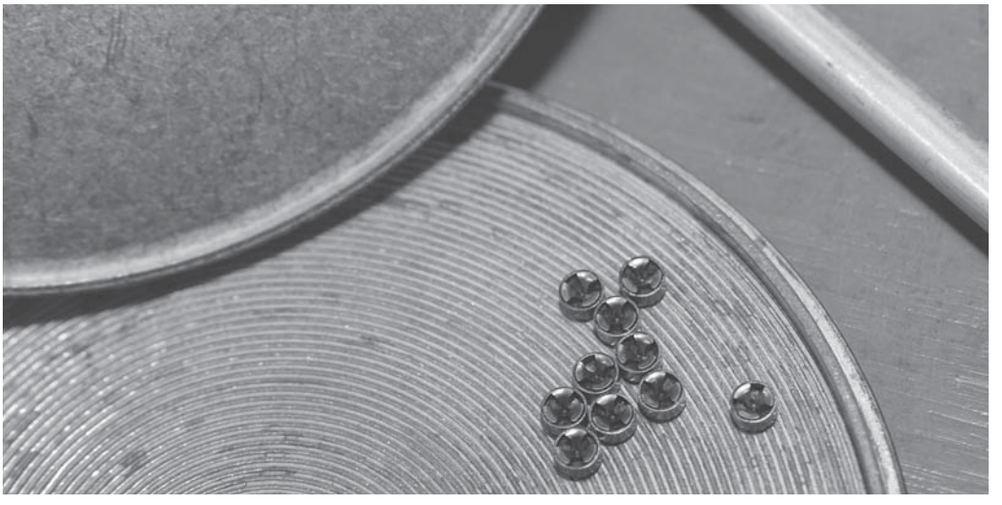
Okay, you have a sleeve/carton/cubic yard of primers on hand and you need to know how to wrestle each of them into a primer pocket. To do this, you do not use your bare fingers, unless you have elected to go with a bare-bones single stage press. And there, yes, they do expect you to pick up each primer, one by one, place it in the little cup on the arm and swing the arm into the press path to seat the primer.

With clean fingers, turn the holdout over.

For all others, there are several options. The first is the hand-seater.

You can go bare-bones again and use a hand-seater that offers just a shell, a lever and a holder. Place one primer in the little cup, slide a sized, deprimed case on, squeeze and seat the primer. It is much faster if you use one of two other hand seaters. One is the design with a tray attached. You open the tray cover, slide a sleeve of primers on (slide the sleeve on, then slide the cover off the sleeve, leaving the primers to drop out of the plastic holder) into the feed tray and then feed them one at a time from the tray into the cup and seat each primer.

The other is the CCI APS system. Here, the primers are held in a plastic belt and the seater advances the strip while presenting each for you to seat it in a case. The APS system not only offers a hand-seating fixture, but a bench-mount that gives you more leverage and a better feel for primer seating.



Gently clamp the smooth tray side over the ribbed one.

Turn the closed tray over.

PROGRESSIVE PRESSES

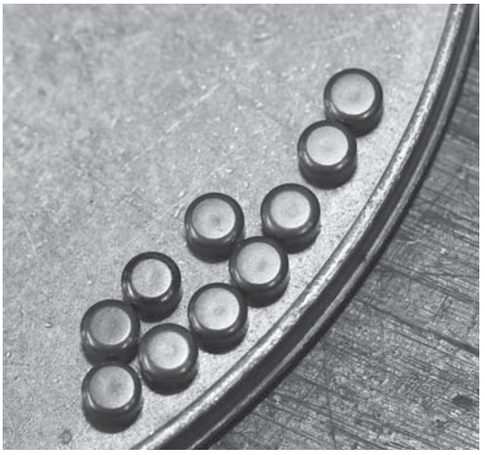
Progressive presses do not permit hand-seating. However, they do a good enough job that only the most accuracy-seeking among us will find them lacking. To load your press feed system you'll need a primer flipper tray and feed tubes. The flipper tray is the two-pancake affair, metal or plastic, and the feeder tubes are aluminum or plastic tubes with a little plastic tip on one end and a clip fastener on the other.

Take your flipper tray and pull it apart. Put the ridged one on the bench and slide a tray of primers (100 of the little spark plugs) onto the flipper tray. If you're in luck, all 100 of them are anvil-side up. Cool. Go to the next step. Mostly, they won't, so pick up the flipper tray and gently swirl it around, sliding the primers on it. The anvil-down primers will have the little protruding feet of the anvil catch in the ridges of the flipper tray, and turn them over. Hence the term "flipper" tray.

Once they are all over (now and then you'll find a really obstinate primer. Just use your clean fingertips to pick it up and turn it over), put the other half of the flipper tray on top of the ridged half and turn the whole assembly over. Now take off the top (now the ridged one) cover, and all your primers are anvil-down.

Pick up your primer tube and set the heel of your hand on the bench. Press the plastic tip of the tube down over each primer in turn, picking them up and storing them in the tube. Once you have all 100 of them in the tube, turn the tube over, place the other end against your primer feed tube on the press and remove the retaining clip that holds them in. They should all slide smoothly down into the feed tube.

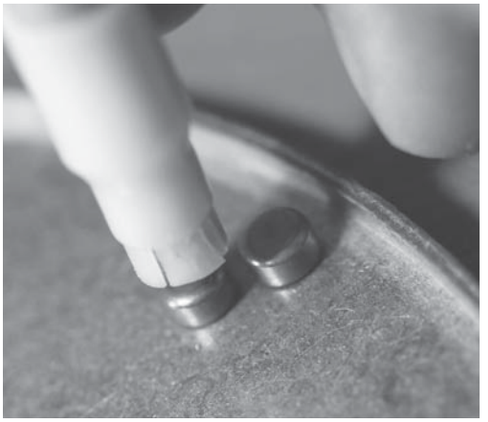
Some reloaders like to have a forest of pickup tubes, so they can have 1,000 primers ready to feed into the machine. Me, I like the



Lift the top (now the ribbed) side off, and you have primers anvil-side down.

Brace your hand on the bench and shove the tip of the pick-up tube down on each in turn.

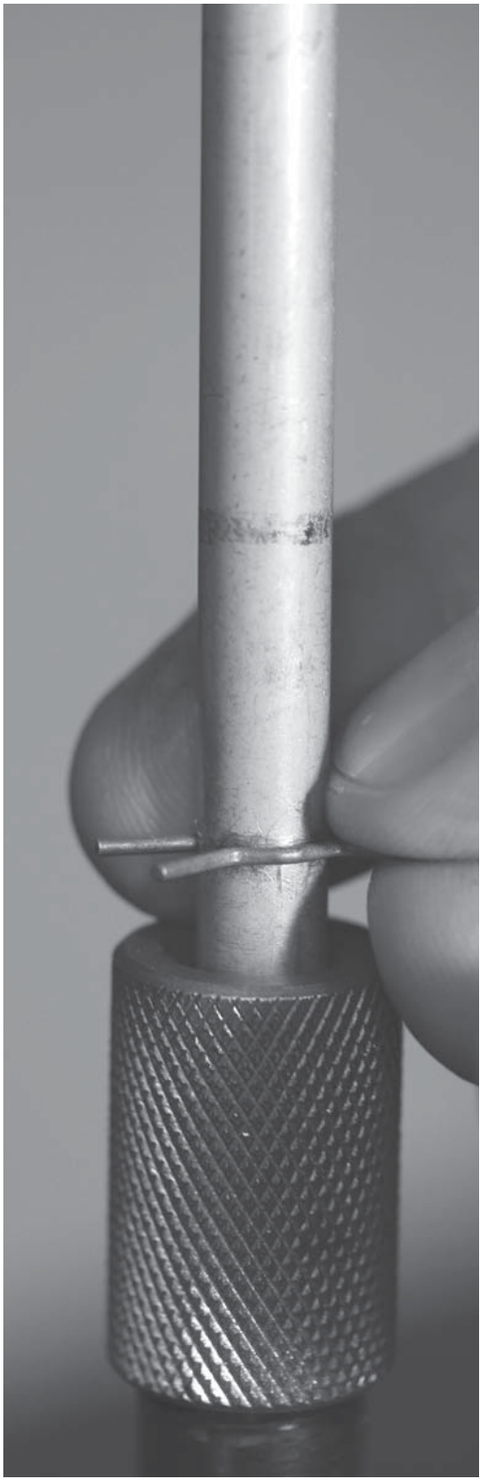
As you pick each up, the plastic tip holds them in place.



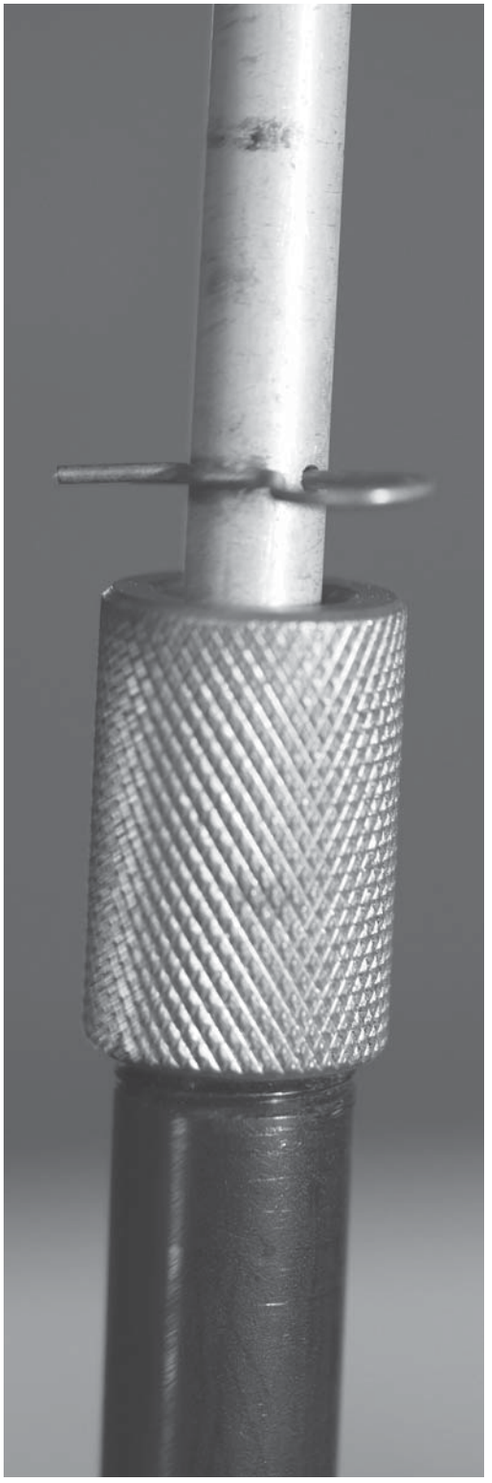
If the tip drops a primer now and then, or when nearly full, it is worn and needs replacing. You did stock spare parts, didn't you?

Almost done, don't rush it….

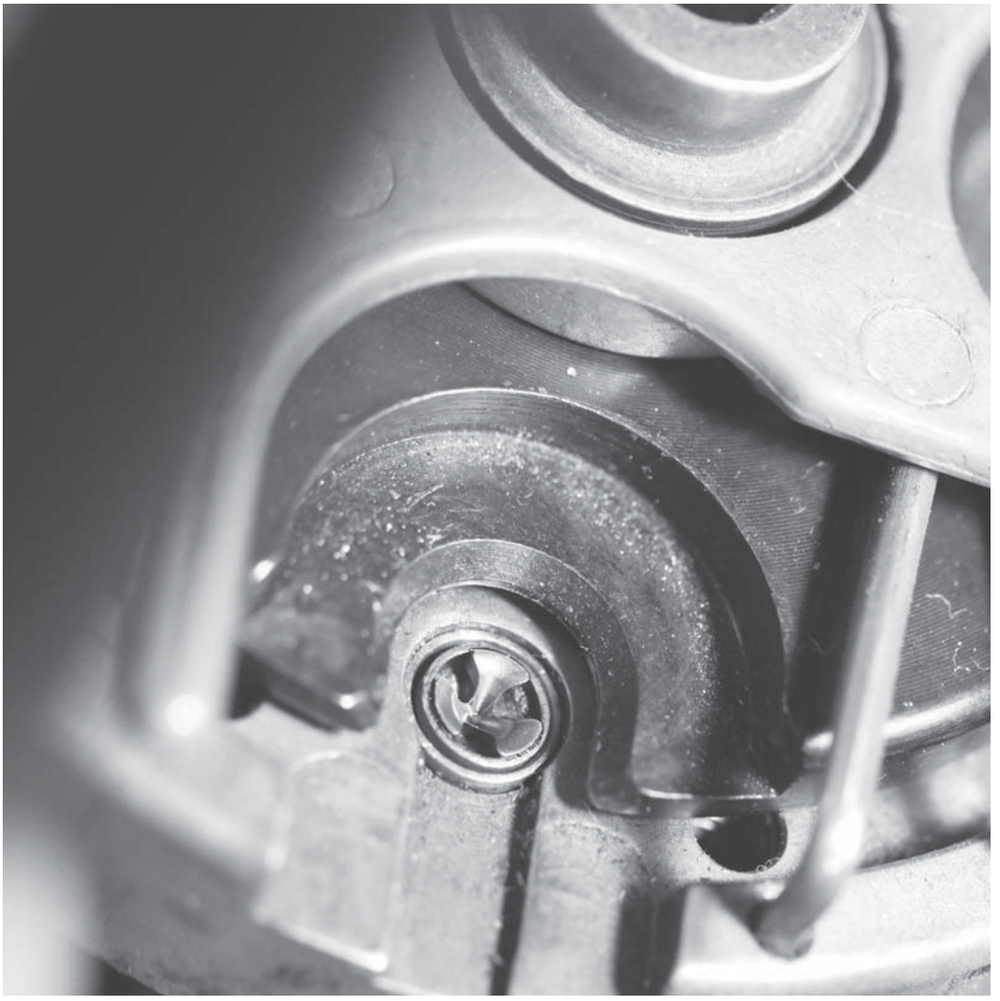
Once done, rest your hand and set the trays and tube aside.



Turn the pickup tube over and place it against the end of the primer feed tube on your press.



Pull out the clip and your primers will slide down into the feed tube. Check the pickup tube, there's almost always a holdout.



Cycle the handle of your press and see that the primer feeds smoothly into the ram.

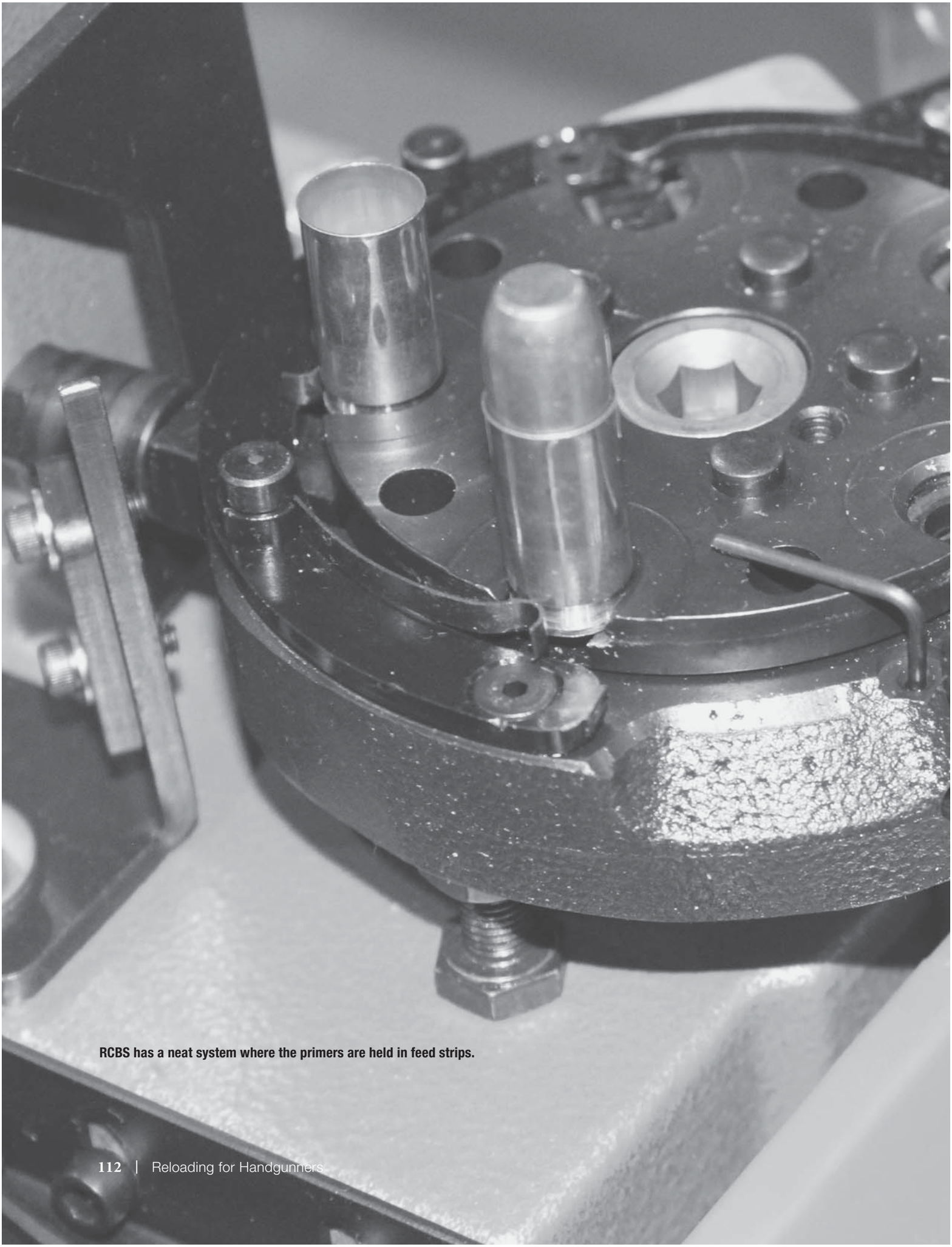
short break between 100 rounds to re-fill the press tube, and the longer break to re-fill the pickup tubes, since I only keep three of each size on hand. Yes, you need a different tube for large pistol and small pistol primers.

PRESS DETAILS

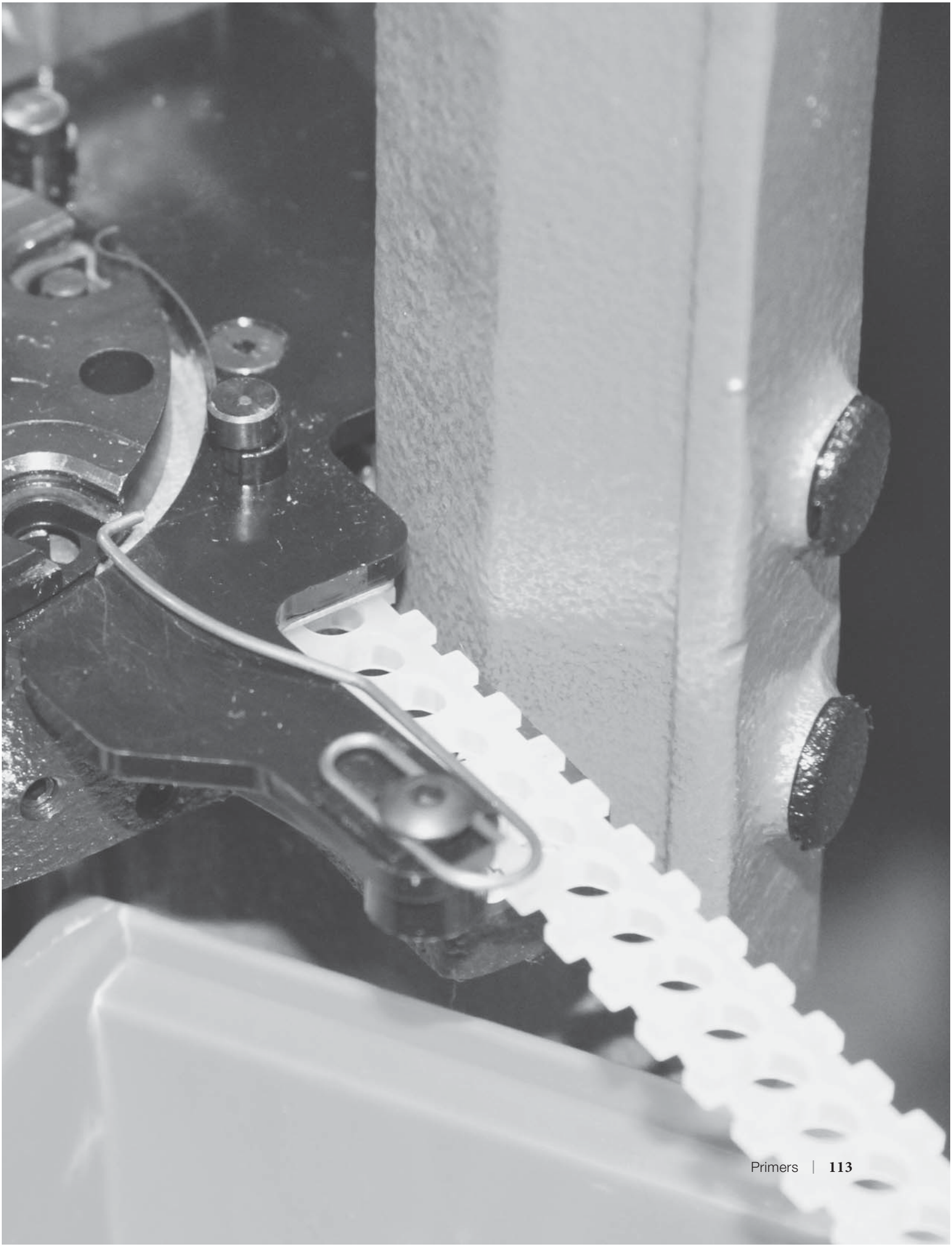
The particular press you use will have its own handling and feed system. It could be circular, or a simple shuttle, moving back and forth to pick up a new primer and feed it to the case to be primed. They all have one thing in common: they will need to be cleaned and maintained.

You see, the fired primers have the residue of the old priming compound in the old primer and primer pockets. Each old primer you punch out spews a small amount of this grit into the air, or on your system. You should build into your loading routine periodic pauses to clean this up. I wipe the system in the grubbiest spots each time I drop another filled tube into the feed tube of the press.

Every time I refill the pickup tubes, I give the primer feed system a quick inspection and make sure nothing is out of sorts. And when I'm done loading for the day or eve-



RCBS has a neat system where the primers are held in feed strips.



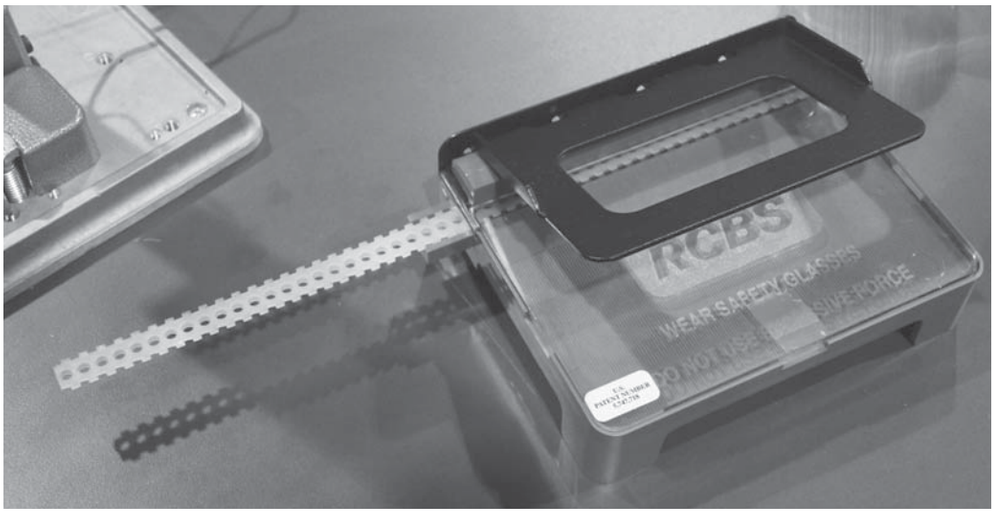
ning, I disassemble the primer system and scrub everything clean. I go so far as to use a small ball of 0000 steel wool to scour the pressed-on bits of residue off of the respective primer feed parts.

And obviously, if in loading I get a primer that isn't fed properly, I stop, disassemble the primer system and scrub it clean.

Primer seating on many presses is by the "over-center" method. That is, the natural and balanced position of the press handle is centered, and while there the press plate can rotate or shuttle. When you press the handle forward, over center, it either pulls the press plate down or the priming system up, and inserts a primer into the case at that station. When you let go, the press pivots back to center and you can proceed.

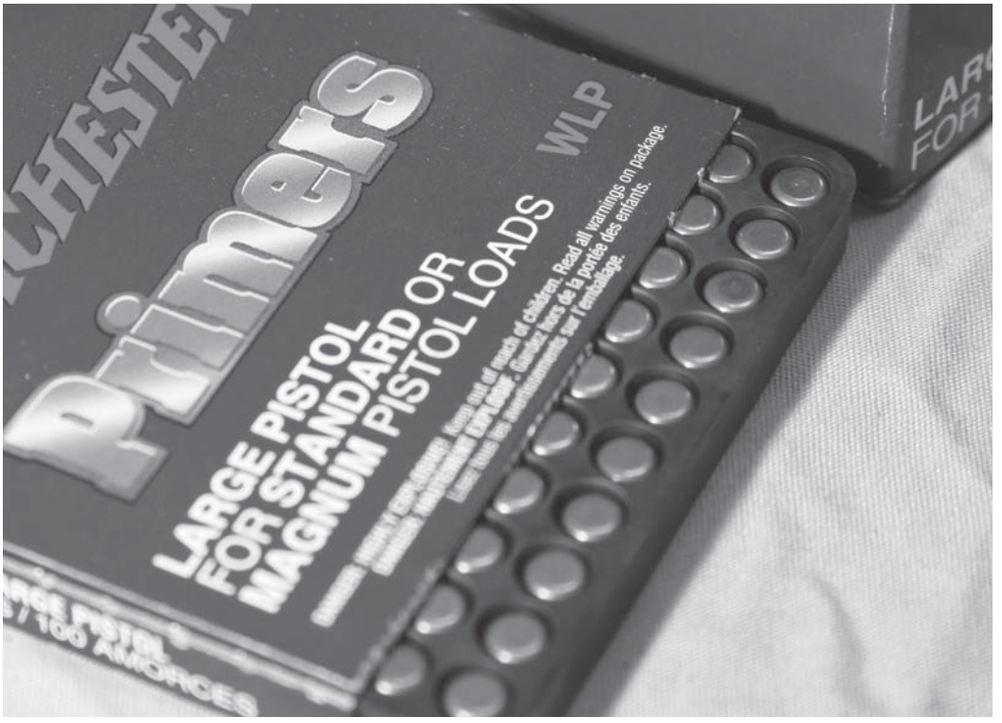
The press handle gives you a lot of leverage and allows of proper seating of primers, but it may not be very sensitive. You might not feel the primers go fully to the bottom position in the primer pocket. They will, however, be plenty close enough for all purposes except the most accurate of loads. It is up to you to learn the "feel" of a properly-seated primer, and to get in a smooth rhythm.

Some presses use a mechanical seating.



You can buy primers in the feed strips, or reload the strips yourself.

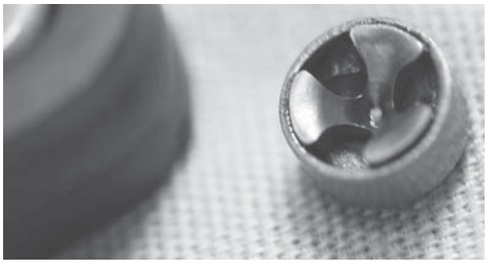
Pay attention to what primers you use, and always buy in bulk. Changing primers can make a difference, and buying in bulk spreads the Hazmat charge over a larger number of primers.



When loading on a progressive press, always load in 100-primer increments. No loose primers left behind, for safety's sake

The classic here is the Dillon 1050. As the press cycles, the primer seater simply moves each primer up a set amount, not an amount dictated by your arm strength. As such, it is adjustable, and some shooters prefer it, not just for the volume it produces, but also because of the uniform primer seating. Recognize, however, that primer seating depends on the shell plate being properly tightened to the ram head. If you leave it loose and allow some (too much) play in that fit, the shell plate will lift away as you are seating primers and you won't be seating them as deeply as you wish.

A nice feature on primer feed systems is the indicator rod. A plastic rod, it both weighs the primer stack down to allow reliable feeding and also shows you how many primers are left. You can, if you wish, install a low primer warning buzzer on your feed tube that the indicator rod presses and causes to buzz when you run out of primers. You don't have that lurch of "no primers at home" as you try to seat a primer that isn't there.



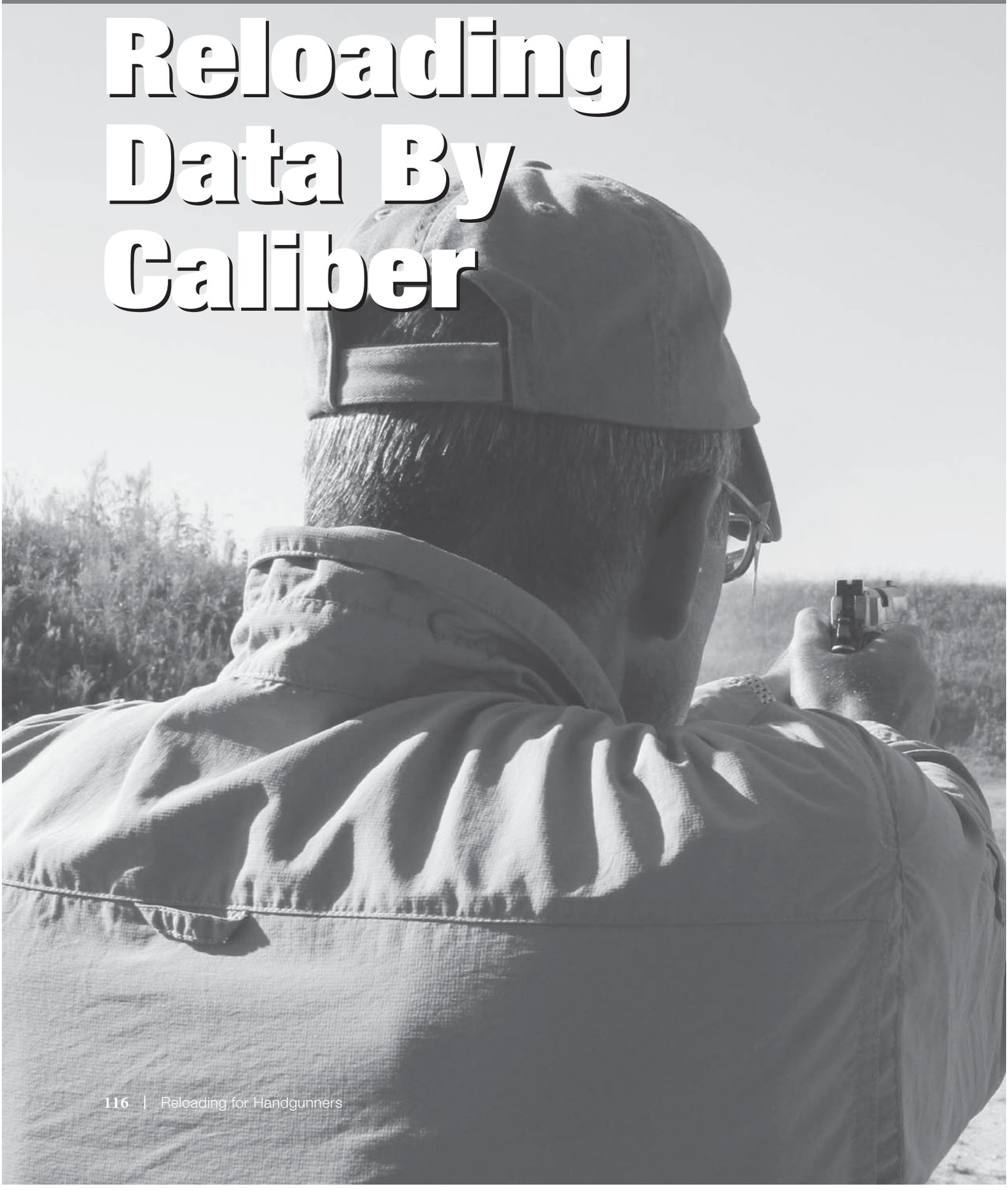
That little three-part thingie in there? That's the anvil.

Uniformly-seated primers are an important part of accurate ammunition. And badly-seated primers will get you shunned at the local gun club, as either the cause of hang-fires or the bad rounds of ammo strewn about the ranges as you struggle with your balky reloads.

Primers, both important and fussy, have to be handled properly. Exercising diligence in their installation can make or break your career as a personal ammunition loader.

Section II

Reloading Data By Caliber



Chapter Nine

9MM PARABELLUM

The 9mm is older than the .45 ACP and nearly as old as the .38 Special, having come about in the first decade of the 20th century. The German Army liked the then-new Luger pistol, but could not bring themselves to hold their noses and adopt the "small-bore" round it was chambered in, the .30 Luger, aka the 7.65x21. Herr Luger opened the case up as much as he could, getting it up to 9mm (the case is tapered, and it really could have been a 9.3/9.5mm) which satisfied the German Army. They adopted it in 1904 and we've been "stuck" with it ever since.

Since then, it has been the chambering of choice for legions of pistols, even some revolvers, and more sub machine guns than you could shake a stick at. It has been made on every continent except Antarctica, and in varying levels of performance and quality, which is both its strength and weakness. It is everywhere; some of it is really, really cheap, but the idea of holding to strict dimensional standards is an idea that has a less-firm hold in some countries and cultures than others.

I first began loading the 9mm in the 1970s, and at that time the situation was simply awful. Brass dimensions were all over the place, even between American makers, and the die makers had their hands full. Carbide dies were new, and Ti-plated dies unknown. My early attempts resulted in cases sized down to have little magnum-like belts on them, and the reliability was on-par with the accuracy: it sucked. The situation was so bad I simply avoided the 9mm for fifteen years, shifting my medium-bore efforts to the .38 Special and .38 Super.

For many years American shooters hated the 9mm. Now we are enamored of it, and for good reasons.

With good dies and care in their setup, you can produce very good lead-bullet ammunition for your pistol.

For accuracy, the top shooters almost to a man (and woman) select Hornady XTP. If your pistol won't shoot accurately with these, don't blame the bullets.

When I came back to it (despite myself, by then I had accumulated a number of 9mm pistols and simply had to figure out 9mm reloading, to save sanity and bank account), things had changed. The main change was the switch by the Army to the Beretta 92 and the ammo for it. You see, when the Air Force first tested 9mm pistols they found that the brand-new 9mm pistols they were ordered to test were not as accurate as the "shot-out" 1911s those new guns were tested against. Ammo was the problem. The Air Force initiated a crash program to develop match 9mm ammo. This roughly coincided with the police switching to the 9mm as well, and the ammo companies had to make accurate 9mm ammo.

When this was going on, I was shooting a lot. As in a weekly PPC league, two indoor leagues (wintertime for all those) as well as twice a month at the gun club. We had multi-stage IPSC matches on the 4th Sunday of each month, and multi-stage 3-gun IPSC (we were one of the first clubs to do this) on the 2nd Sunday. I was also practicing for the Steel Challenge and Second Chance, during the times those particular matches loomed on the schedule. I was spending a lot of time loading. My medium-bore gun of choice, where the caliber was appropriate, was the .38 Super. It was a lot easier to load for than the 9mm (or at least, easier in my memory) but then a sea-change loomed: the boss wanted to get into commercial reloading.

He had sought out a better source for ammo of the gun shop and came upon a small commercial reloader. As Tim put it, "I realized that every time I handed a customer a box of .44 Mags I could be netting ten dollars instead of two." He wanted to buy the loading operation, lock, stock and loading machines. If the shop was going to become a commercial reloading facility, we were for sure not going to be loading .38 Super. So, the gun I was in the process of building became a two-caliber gun, a .38 Super and a 9mm, via two fitted barrels.

I looked into loading (I figured there would be a transition period, plus I wanted to know

enough to steer our product to my needs) and found that while I had "been gone" the world of 9mm reloading had made vast improvements.

Also, the reloaders had made great steps up as well. First among them was the near-universal disregard for "surplus" brass. In the before days, we had simply assumed (and wrongly) that "brass was brass" and why wasn't this obstinate German/commie/smg brass cooperating? Reloaders had given up on the cheapest stuff and were committed to using good brass.

That, and the realization also that in some guns reliability was all you were going to get, and you could not load "match" ammo for some guns. "I don't care that your uncle took that Luger off a Waffen SS Colonel, the bore is pitted and it is not going to work as a Bullseye gun."

Today, the surplus guns are mostly in collections and rarely on the range. We have a much better fit of bores to bullets, dimensionally speaking, than we had in the old days. But that doesn't mean we're free from strange situations.

UFOS

In the course of building guns for matches, I built a .38 Super/9mm pistol (one of a near shelf-full) that was meant for Second Chance. It used as the 9mm upper (it was on a Caspian 1911 frame) a Colt commander slide, a 6-inch Olympic Arms barrel, and lots of creative sculpting and engineering. Fed high-speed hollowpoints, it broomed pins off the tables with alacrity (faster than I could, alas) and shot accurately, ragged one-hole groups at 25 yards.

My SC load was 115 JHPs boosted to just under 1300 fps. The practice load was my all-purpose load: 4.2 grains of Bullseye, for this gun, under a 147 grain Duro-Cast lead flat-point. (They actually weighed a smidge under 150, and were heat-treated for hardness. Great bullets, but once the 50,000 I had were gone, unfortunately so was the company.) Some years later I was checking my brand-new (an SC prize gun) Beretta M92 with this load. I shot a quick group at ten yards, saw the center was on the aiming point, and went to shoot the match the next day, in Production Division.

That day, I had bullets going sideways through targets. What I found was this: out of that gun, that load could not be counted on to keep all five shots on a USPSA target at 25 yards. They tumbled so badly they missed the target. Over the next few weeks, I hauled every 9mm I had or could borrow to the range, and tested them with two loads – Winchester "white box" and the Duro-Cast/Bullseye load. What I found was that a lot of them did not like the latter. Some even hated it more passionately than the Beretta did.

And yet, no .38 Super I owned, fed the same Duro-Cast/Bullseye recipe, shot other than brilliantly. I set out to find out why. I measured bores and rifling twist. I varied the alloy from dead-soft (don't bother, it sucks in all uses here) to just short of pewter in hardness. I varied diameter from .354 inch to .359 inch. I even fire-lapped some bores, re-crowned other barrels and did one abortive experiment with fiber wads under the bullets. (A fiber wad, starting out at 1000+ fps, crashing into a chrono screen, makes a mess.)

The only solution was to change powders. The problem decreased as I went slower, and

WW-231 seems to be the threshold. There, or slower-burning powders, and the recalcitrant 9mms shot just fine.

So, if you go the lead bullet and econo-powder route, and load a softy load with Bullseye, with the result that your pistol shoots like snot, there's your answer. Switch to WW-231 or a bit slower-burning powder and you'll be fine.

CRIMP MY STYLE

The 9mm is perhaps the most sensitive to crimp of any caliber I've loaded. It is particularly sensitive if you are loading lead or plated bullet. Jacketed, it doesn't care so much, but get the wrong crimp (as in, too much) on lead or plated, and you will have crappy accuracy.

What you have to do is first load to the dimensions listed. Load some, but not five-gallon buckets full. Go to the range and test-fire your ammo. Check for accuracy. If you ammo is accurate, you're done. If it isn't, ease up on the crimp on the next batch, by about 1/8th of a turn of the die. Load and repeat. Once you have accurate ammo, check bullet set-back. If your load passes the set-back test, you are done. If not, you will have to try a different powder (shift to a medium burn-rate) or bullet (better chances of success) and start over.

You cannot, however, settle for too little crimp as an option. The flared case mouth will cause drag on feeding, and the bullets may set back as well. You have to have some crimp, even if all it does is remove the flare from bullet seating.

MAJOR-MINOR

If you cruise the internet forums long enough and read up on practical shooting, you'll sooner or later read about "9mm Major." This is a 9mm Parabellum loaded to make IPSC/USPSA major – and this is important – in an Open Division pistol. The current Major Power Factor is 165 in the U.S., 160 in international competition. In order for a 9mm to make Major and have enough of a cushion to overcome climactic and chronographic differences, you have to push a 124 grain JHP to 1371 fps, or a 125 JHP to 1360 fps. Ouch. This is an important data point to

Plated bullets work great in the 9mm as long as you take care in setting up your crimp. Pick the wrong diameter and you won't be happy.

For the 9mm, you have two main choices: a single action (top, my Ti Commander) for IDPA, Steel, USPSA and carry; or a double action/striker (a very early Ruger SR9) for IDPA & USPSA Production, and carry.

note: Most reloading data on the 125 tops out in the low-to-mid 1100s. As in, a 125 at 1169 fps, a top-end load with a listed pressure of 27K psi. (Curiously, another powder from the same powder maker shows 1162 fps at 33K psi. But, we discussed situations like that in the powder chapter.)

Now, if we extrapolate (always a dangerous job) we can see that pressures in the 1300 fps region will be beyond reasonable. If the powder-to-velocity-to-pressure ratio stays linear, we can estimate pressure for Major at 38,000 psi. That's the average, folks, which means that half of the shots will experience a pressure higher than that. And, the pressure graph is not likely to remain linear up there.

Commercial reloaders (the folks who develop data) typically stop adding powder when the results begin to go non-linear. As an example (and not the instance here) if they have, for every .5 grains of powder they've increased in test loads up to a certain point, gotten 50 fps increase and now all of a sudden adding .5 grains gets them 25 (or 75) they call it quits. Each powder has a pressure range in which it is happy to work. Outside of that range, powders get squirrely.

We could easily gain pressure greatly out

of proportion with velocity, which is the usually result of pushing a powder past its happy limit.

What if the system goes non-linear? How about this instead: For any given increase in powder/velocity past the maximum listed, we get double the increase in pressure? Then, expecting to go from max to Major, and suffer a modest (albeit over-SAAMI-spec) pressure increase, we get this instead: a 125 gr JHP at 1360 fps and 43,700 psi. The Proof Load, the single round of which each firearm is tested with at the factory, is 49,000 psi. So, when you are trying to load 9mm Major, you are basically zooming up to the limits of proof loads and then feeding that to your pistol in a steady diet. And that is if the pressure increase is only double as powder and velocity increase.

In asking professional ballisticians about this subject, once they get over the pale look, they report to me that my estimate of pressure is low. It is the instance, in many loads they have tested, to record pressures in the low 50,000 psi range. That's rifle pressure range, folks, and not for us to recommend.

As we have noted, you cannot use pressure signs as loading limits in handguns. By the time you see them, you have long-since passed the safe limits. So, when someone tells you they have been loading 9mm Major and haven't seen any pressure signs, all that means is they haven't yet reached the nearly 60,000 psi needed to see signs. That their pistol has been suffering all this time in the high 40s or low 50s is not encouraging. Or safe and reasonable.

Now, 9mm Major is allowed in competition. I will get all kinds of complaints frowm people who have been merrily shooting 9mm Major for years with "no problems." 9mm Major is permitted in Open, and Open guns are typically hand-fitted by master gunsmiths. Knowing all the tricks, they can reduce the wear and tear on the guns. Reduce, not eliminate. Their guns are analogous to NASCAR engines – balanced, blue-printed, able to withstand 12,000 rpm for one race, before being rebuilt. That, however, does not help you with your box-stock 9mm, which has been set up by the factory to run 100 percent with standard 9mm. Simply adding a heavier recoil spring won't help your situation.

Long story short, people will do it, but not with my help. That's why you won't see any 9mm Major data here.

THE NON SEA-CHANGE

Oh, and the boss who wanted to get into commercial reloading? He couldn't decide, on the Friday he was considering this, whether he really wanted to make the jump. So he thought about it over the weekend. Well, you guessed it, the reloader sold his operation, down to the last bullet, primer and post-it note on loading procedures, that weekend. We did not become a commercial reloading operation. I continued as a gunsmith. Had Tim made that change, I and a bunch of other people would have followed an entirely different life path.

Such is the nature of choice.

9mm Chronograph Results, Beretta M-92					
Weight & Brand	O.A.L.	Powder	Weight	Velocity	Power Factor
115 Sierra JRN	1.130”	WW-231	4.9	1121	129
115 Sierra JRN	1.130”	AA#2	4.8	1100	126
115 Sierra JRN	1.130”	HP-38	5	1124	129
115 Sierra JHP JRN	1.130”	Titegroup	4.6	1110	128
115 Sierra JHP	1.055”	WSF	5.4	1101	127
124 West Coast	1.130”	Titegroup	4.1	1054	131
125 LRN	1.130”	AA#2	5.8	1005	126
125 LRN	1.130”	Green Dot	4.5	1061	133
125 LRN	1.130”	Bullseye	4.2	1085	136
124 Berrys	1.130”	Bullseye	4.2	1036	129
125 JSP-Star	1.130”	WW-231	4.2	1005	126
125 LRN	1.130”	Herco	5	1131	141
125 LRN	1.130”	Titegroup	4.2	1070	134
124 XTP	1.060”	Autocomp	4.7	1041	129
124 XTP	1.060”	VV-320	4.2	1071	133
124 XTP	1.060”	VV-330	5	1124	139
147 DuroCast	1.070”	WW-231	3.5	885	130
147 DuroCast	1.070”	AA#2	3.7	896	132
147 DuroCast	1.070”	Bullseye	3.2	886	130
147 Rainier	1.130”	Bullseye	3.2	847	125
147 Rainier	1.130”	AA#2	3.7	858	126
147 DuroCast	1.070”	AA#5	5.1	897	132
147 DuroCast	1.070”	Green Dot	3.5	875	129
147 DuroCast	1.070”	Titegroup	3.4	874	129
147 Berrys	1.070”	VV-320	3.8	974	143
147 Berrys	1.070”	Autocomp	3.7	899	132
147 Berrys	1.070”	Action Pistol	5.2	1011	148
147 Berrys	1.070”	VV-340	4.2	1035	152
147 Berrys	1.070”	Titegroup	3.3	876	129
Baseline comparators: Factory loads					
Black Hills 115 JHP				1232	142
Cor-Bon 115 FMJ				1113	128
CCI Blazer 115 JRN				1155	133
W-W 115 Silvertip				1155	133
W-W 115 FMJ White Box				1111	128
Black Hills 115 JHP +P				1325	152
Triton 115 JHP +P				1302	150
Cor-Bon 115 JHP +P				1342	154
Federal 115 JHP +P+ (LEO-Only)				1273	146
CCI Blazer 124 TMJ				1021	126
Black Hills 124 JHP				1082	134
Triton 125 JHP +P				1240	155
Triton 135 JHP +P				1165	157
Remington 147 FMJ				868	127
Federal 147 JHP				945	139

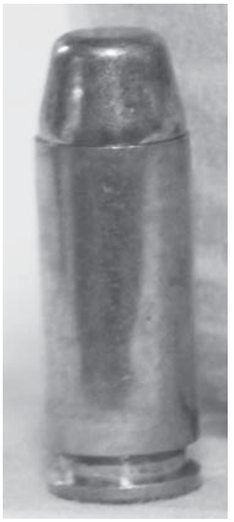
Chapter Ten

10MM

Sometimes, you can ask for too much. And when you ask and get too much, all you can do is do your best. The 10mm comes to us from *Guns & Ammo* magazine, where in 1974 Whit Collins and others developed a new cartridge – the .40 G&A. It was a true .40, using .400-inch bullets in cut-down .30 Remington rifle cases. The rounds went into a barrel fitted to a modified Browning Hi-Power, the idea being that not only would they split the difference between the 9mm and .45 in size, but in capacity, too.

The bullets they used were jacketed soft-points, meant to be loaded in the then near-obsolete .38-40. The result was 180s fired at just over 1,000 fps, pretty much the same performance that a high-speed loading of the .38-40 would have delivered. Soon after, Jeff Cooper was cheering on the Bren Ten, a pistol meant to improve on the 1911, to offer everything: more rounds, more performance, more features. The 10mm round grew and grew until, when it arrived courtesy of Norma, the performance was not just improved, but imposing: 200 grain bullets at 1200 fps.

Alas, the Bren Ten failed. Colt resurrected the 10mm from near-certain obscurity by chambering their 1911 in it. And then, the FBI seemed ready to raise it to the peak of the pantheon, discarding the 9mm after the Miami shooting in 1986. Since then, the 10mm has been left to the margins, replaced in law enforcement by the 40 S&W. However, for those willing to practice, the power of the 10mm can be theirs to command. And, in a self-loading pistol, it is a lot of power to be tapped.



Load medium-weight bullets to modest velocities, and the 10mm becomes a real joy to shoot. At 147 PF, the brass never wears out.

The big Ten takes bullets from 135 grains (left) to 200 (right), with most using 180s. (Loaded)

For light-weight recoil, 135 plated works like a charm. If you feel the need for speed, go with jacketed. Remember, plated bullets don't like velocities much past 1200 fps.

Lovers of the 10 will have happily found that the brass is almost indestructible. Short of loading your cases with Semtex, you'd be hard-pressed to wear out brass before you wore yourself out. It uses .400-inch jacketed, and .401-inch lead bullets, and with the huge volumes of .40 S&W pistols out there, such bullets are easy to find. It uses large pistol

An accurate 10mm pistol offers you a wide range of power options in a convenient package.

primers, and if you can't find those you are either in the wrong shop or in the midst of yet another primer-buying frenzy.

All the pistols that have been made in volume for it are more than durable. So, the loading data is not leaned-out in deference to older, weaker, guns, as it often is in other cartridges that have a small but loyal following. If you only want .40 S&W performance out of your 10mm, you can have that. Simply use .40 S&W loading data in 10mm cases. You'll find the velocities are lower, but if you use top-end 40 data you'll have a softer-than-top-end result in your 10mm.

What you cannot do is simply load 40 S&W ammo into your 10mm. While mechanically the 40/10 brotherhood compares exactly to the.38/.357 brotherhood, there is no rim to control headspace. Your 40 will slop around in the longer 10mm chamber, and probably not fire. If it does, it will be messy, as the 40 case, with its excessive headspace, will certainly show you flattened primers.

Keep the two separate.

The lightest bullets available for the 10mm are 135 grains from Nosler. The short bearing surface can lead to accuracy problems, not because the bullets aren't suitable (they

Lovers of the 10 will have happily found that the brass is almost indestructible.

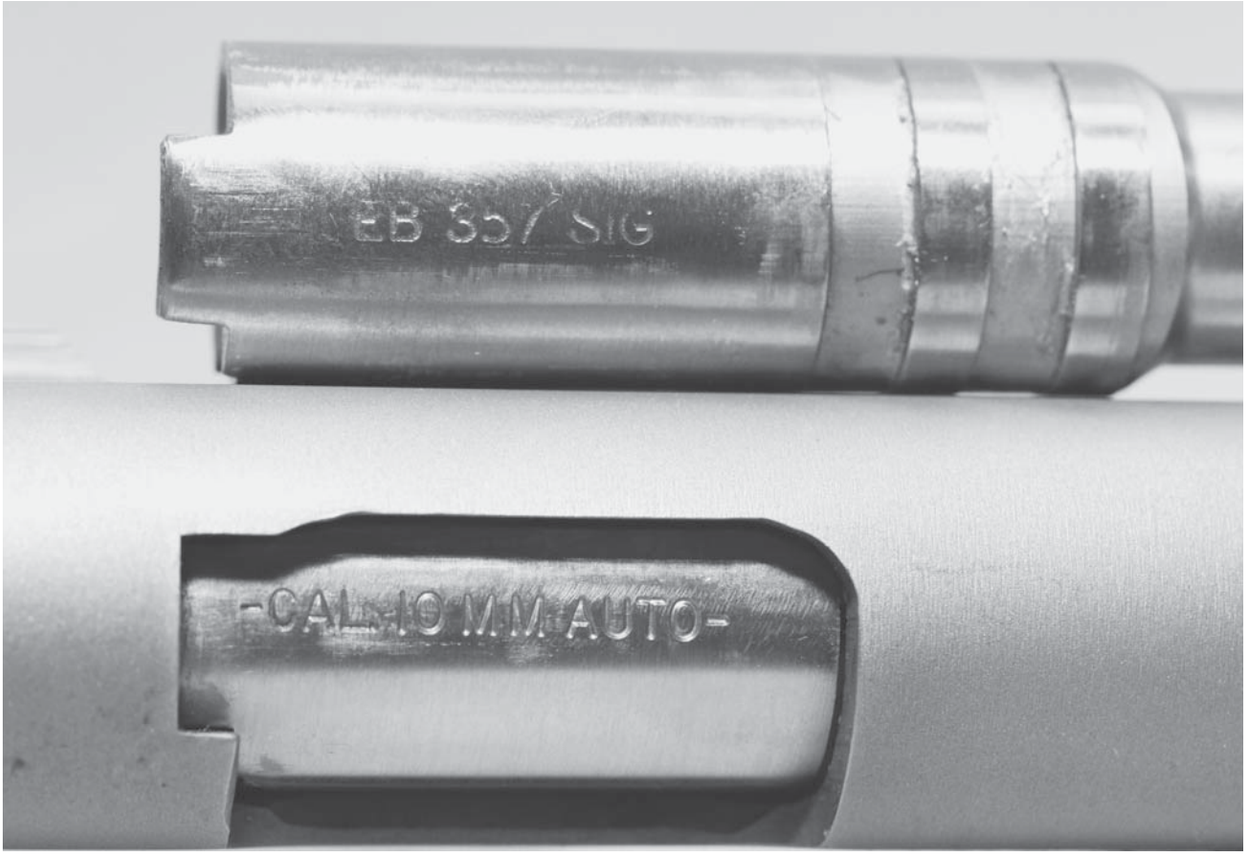
are Noslers, for goodness sake) but in keeping them straight in the cases. A much easier bullet for lading is the 155, available from just about everyone, and those can be boosted to supersonic velocities with ease. Where the 135s can get to 1450, the 155s can easily reach 1350 fps.

The compromise bullet, between those desiring velocity at all costs and those who want mass, is the 165 grain jhp.

The "normal" bullet weight range for the10mm is the 180 and 200 grain weight. If you walk into a gun store with reloading components and ask for "40 or 10mm bullets," chances are that the bullets they have are going to be 180 grains in weight. The 180 works well for 40 or 10mm, and that is why if they have any, those are the ones they have.

If you want more penetration or desire the traditional 10mm bullet weight, then the 200s are your best choice, but not the only one. You can find hard-cast 10mm bullets of 220 grains. They just are going to be 10mm-only bullets, not working in 40 S&W cases. Were I depending on an autoloading pistol for bear defense (and if you really want to know, my idea of an appropriate firearm for such a task starts at .338 Win Mag and goes up from there) it would be a 10mm, shooting 220 grain hard-cast lead bullets, and boosting them out at just over 1100 fps.

The 10mm uses large pistol primers, .400-inch jacketed and .401-inch lead bullets, and the crimp and neck diameter specs are the same as for the 40 S&W.



The 10mm, at least in 1911 guise, is also easily changed to 40 and .357 Sig.

We can thank Colt for having saved the 10mm from fading out.

10mm, 1911 5" barrel				
Bullet	Powder	Weight	Velocity	Power Factor
155 Oregon Trail	Bullseye	5	939	145
155 Berry's FP	Bullseye	5	921	143
170 Oregon Trail SWC	Bullseye	5	997	174
170 Oregon Trail SWC	Bullseye	5.2	1029	175
170 Oregon Trail SWC	Titegroup	5.1	962	163
170 Oregon Trail SWC	WW-231	5.8	984	167
180 Hornady HAP	Titegroup	5.8	1098	198
180 Hornady HAP	WW-231	5.6	1009	181
180 Hornady HAP	Autocomp	7.6	1187	214
180 Hornady HAP	HS-6	9.2	1134	204
180 Hornady FMJ	WW-231	5.6	949	171
180 Berry's FP	Titegroup	5.8	1067	192
180 Berry's FP	WW-231	5.6	989	178
180 Berry's FP	Autocomp	7.6	1148	207
180 Berry's FP	HS-6	9.2	1127	203
200 Colorado Cast	Bullseye	5.2	994	199
200 Colorado Cast	Titegroup	5.2	973	195
200 Hornady XTP	Bullseye	5	939	188
200 Hornady XTP	Unique	6.2	983	197
200 Hornady XTP	Autocomp	7	1082	216
200 Hornady XTP	VV-3N37	6.3	1001	200

Chapter Eleven

.32 AUTO

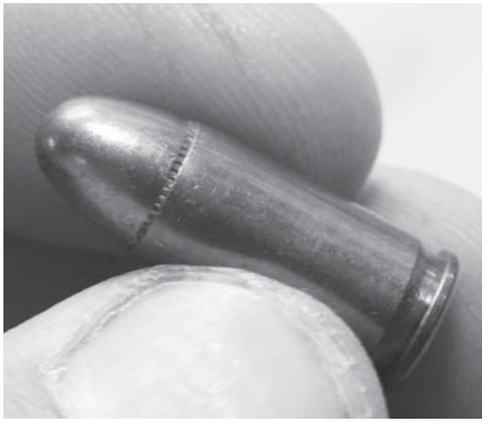
Also known as the .32 ACP, the 7.65 Browning and 7.65x17, the .32 auto, designed by John Moses Browning for his M1900 pistol (the FN one, not the Colt one), it is a perfect example of its time. A straight-walled case with a semi-rim, it operates at a low enough pressure that it can easily be handled by blow-back pistols. Sales of the M1900 were so brisk they saved FN from bankruptcy, and the cartridge has been with us ever since. Why was it popular? Well, the M1900 was light, flat, compact, and in an era of bulky, cranky pistols, reliability was valuable. With an M1900 in one's pocket (clothes were made of heavier cloth back then) you could be discreetly armed. Oh, you mean the cartridge?

It offers several good points, and one bad. The good points are mostly obvious – it has low recoil, it can be had in compact, easily-carried pistols and it can be surprisingly accurate. The low pressure means a mild report, not ear-splitting, and back then (and for a long time) pistols were all-steel. Recoil was minimal. The downside is just as obvious; it is marginally powerful and bullets cannot be made to expand on impact. As a result, one should treat the .32 as a high-speed drill, and not count on any expansion. Even the best low-velocity expanders, the XTP, can't be expected to do much at the typical maximum .32 ACP velocity of 850 fps. Put it into modern, very compact pistols, and you lose velocity. A 72 grain fmj at 725 fps is not going to knock a felon on his butt. (Not that any handgun cartridge can be depended on to do that, but the .32 comes up even shorter than most of the others.)

One might ask, "Why reload the .32?" Considered by many as a low-cost defensive firearm, one owned by those reluctant to practice, the .32 would not seem to be a suitable candidate for reloading. Remember the lack of expansion? You cannot depend on power making up for less-than-center hits. Depending on a .32 for defense means accepting the need for accurate shots. Practice makes for accuracy, and the expense of factory .32 ACP will quickly break any practice plans.

The good part of reloading is that the low pressure means cases last almost forever and you don't use a lot of powder. At the usual loadings, two to three grains of powder per, a pound will last through 2,300 to 3,500 rounds.

With an operating pressure in the low teens, the .32 ACP has no need for magnum primers, and standard small pistol primers work just fine. You do, however, have to ensure good neck tension, for bullet setback will quickly spike pressures past the safe level. Also, over-all length is important. As the .32 is found in compact pistols, there isn't a whole lot of margin for long or short. That, and a gentle crimp to ensure reliable feeding, is all you need to make buckets of practice ammo.



The biggest problem with the .32 Auto is the size, as in handling it. If you aren't careful, you'll get your fingertips pinched in the press in the loading process.

The little .32 Auto doesn't give us many options in bullet weight. Pretty much, 71 grain FMJs, and 60 grain JHPs.

While other calibers offer room for experimentation, here you will have almost none. What you are looking for is a reliable, accurate load that works your particular pistol and hits to your sights. Then you can get to the work of building skills. "Magnumizing" the .32 ACP is an oxymoron of the first order.

The biggest headaches of reloading the .32 Auto are powders and handling. You are limited to the fastest-burning powders to be found, for the simple reason of lack of case capacity. You can't go to a slower-burning powder to gain velocity, as there isn't room. And finding a powder measure to dispense pinches of powder isn't easy. Dillon (my main reloading press) makes a special low-volume powder bar for their powder measure, so you can drop such thundering charges as 2.3 grains of whatever.

Additionally, the cases and bullets are small. You will have to learn patience when loading the .32, as you learn to handle small cases and perch tiny bullets on top of case mouths. But the reward is buckets of practice ammo, which would otherwise have cost a house payment to procure as factory ammo.

As a historical note, the .32 ACP began one war and ended another. The arch-Duke Ferdinand was assassinated by Gavrilo Princep, who used a Browning M1910 (not an M1900, as had been believed for many years) chambered in .32 ACP. Adolf Hitler ended his miserable existence using a Walther PP in .32 ACP.

Some consider the .32 beneath consideration and exclaim that the .380 is the minimum (and a paltry one at that) for self-defense. Bad guys don't care much what caliber you have. What they look for is not bore size, but the determination in your eyes and the skill with which you handle your firearm. Practice, and you will have the skill.

Depending on the pistol you have (bore sizes varied in the first half of the 20th century), the bullet that would be perfect can vary from .308 inch to the norm of .312 inch and even more. Your choices in that regard are simple: jacketed bullets are .312 inch in size. Cast bullets are that or .313 inch, unless you invest in a custom mould of larger or smaller size. A custom mould will probably cost you as much as the pistol, and casting bullets to feed it is a head-scratching puzzle, as in, why? If you love casting and are already set up for it, go ahead. But otherwise the savings are so small as to be miniscule.

The .32 ACP uses a small pistol primer, and there is nothing to be gained by using small pistol magnum primers, nor any rifle primers.

.32 ACP

Bullet	Powder	Weight	Velocity
71 Berry's RN	Titegroup	2.2	898
71 Berry's RN	WW-231	2.3	863
71 Berry's RN	Autocomp	3	912
78 Oregon Trail	Titegroup	2.1	849
78 Oregon Trail	WW-231	2.3	817
78 Oregon Trail	Bullseye	2.2	861
60 Hornady XTP	VV-310	1.5	929
60 Hornady XTP	Bullseye	2.3	931
60 Hornady XTP	WW-231	2.5	946

Chapter Twelve

.32 REVOLVERS – SHORT, LONG, MAGNUM, .327 AND .32-20

A century ago, revolvers chambered in one or another .32 cartridge were well-thought of. There was no end of pocket revolvers chambered in .32 Short, and even some in .32 Long.

We all think of the SAA chambered in something big, like .45 Colt or .44 WCF. The third most-popular chambering was .32-20. Apparently a whole lot of cowboys and other denizens of the West thought well enough of the .32-20 to be packing it daily. When S&W unveiled their new (and competition-slaying) K-frame revolver, the first chambering available was .32-20. It was a year later, in 1899, when you could get yours in the new target and service cartridge, the .38 S&W Special.

In 1984, Harrington & Richardson tried to breath new life into the .32. They teamed up with Federal to create the .32 H&R Magnum. As with all other magnums, it is a stretched and higher-pressure case based on the shorter originals, so you can use the earlier cartridges in the newer gun, but not fit the new high-pressure cartridge in an older one. The H&R is longer than the Long, but shorter than the .32-20. Why? H&R was making the cartridge to sell H&R revolvers. The .32 H&R was as long as it could be and still fit into an H&R revolver frame. It was also not up to the pressures of other magnums, again because that was what the H&R product line could take.

For a cartridge family no one pays much attention to (at least not much until the advent of Cowboy Action) there are plenty of components available. Bullets are not difficult to find, although you may not find the selection of weights you have in other diameters.

And speaking of diameters, you can be casual or precise. Nominally, any of the .32 calibers take a .312-inch bullet. If you're loading up some ammo for grand-dad's old pocket .32, you may find bore diameters anywhere from .308 inch up to .314 inch. Accuracy with pocket .32s often depends more on the condition of the bore than diameter of the bullet. If you want to increase the odds of an accurate revolver without making yourself crazy, load bullets matching the throat diameter (if possible) and don't worry about bore diameter. In later guns, or earlier ones where the dimensions work out properly, accuracy in a .32 can be quite good, even startling.

In jacketed bullets, you have two diameter

"Magnumizing" the .32 ACP is an oxymoron of the first order.

A note about older revolvers

If you are loading to feed an old Colt, S&W or an Iver Johnson in good shape, you can run right up to the SAAMI spec pressure for the cartridge you're loading. Even the softer steels of the older guns can withstand a lifetime of ammo in the 12,000 to 15,000 psi range. But a lot of "Iver Johnson" revolvers can't. Many older .32s should be retired and kept solely as souvenirs of times gone by. If you have any doubts at all, have yours checked over by a gunsmith familiar with older revolvers.

.32 revolvers can be divided into three groups, each in two strengths. At the bottom are the pocket guns, the defensive snubbies. The century-old guns are best shot with the softest loads, using nothing stout. The intermediate snubbies, the S&W airweights, are up to the top-end loads of the .32 Long.

The middle guns are the S&W K-frames, .32 Long and .32-20. Even into the 1950s S&W was making .32 Target revolvers. But for all their size, I'd not feed the old target guns more than standard .32 Long ammo. The S&W M-16 was made in .32 H&R Magnum, and as a modern gun chambered for it, you can use .32 H&R Magnum ammo to your heart's content in it.

Last are the SAA and clones. Original guns are large, but the steel is soft. Stick with mild reloads in .32-20. Modern guns are made of better steel, but there is no need for magnum-level loads, as the velocity ceiling in CAS doesn't permit them. For small game, a modern SAA in .32-20 can be pumped up to interesting levels, but it is still only a .32. Do not be deceived by the sharp bark, it isn't a big-game cartridge.

The newest, the .327 Federal Magnum, is another beast entirely. It runs at 45,000 psi, and it is to be fired only in modern revolvers made specifically for it. Do not even think of having your gunsmith ream out the chambers of an older revolver. He'd be foolish to do so, and you'll be sorry he did.

choices: bullets intended for the .32 with diameters of .31 inch, and lightweight .30 rifle bullets, running .308 inch and around 100 grains. The Speer "Plinker" bullet is a perfect example of such a bullet. A half-jacket 100 grain .308-inch bullet, it is meant for plinking loads in .30 rifles, but can be pressed into service in a .32 revolver. Loaded to 800 fps in a snubby Colt Police Positive, the Speer bullet will penetrate heavy automotive sheet metal entering, but not exiting the trunk of a 1976 Chrysler New Yorker. (Not exactly a standard test used by the FBI, but an interesting data point nonetheless. The clever ones among you will know how I know this.) For those more interested in expansion, the Hornady 85 and 100 grain XTP bullets will expand at the middle velocities of the .32 range. Loading 100 grain XTPs in a .32 S&W Short expecting them to expand out of a snubby is far too optimistic.

In lead, bullet diameters of .312 and .314 inch are common, and weights ranging from 85 to 115 grains can be had. The heavier bullets are meant for use in the .32-20, as they are too heavy to be used in the Short. Probably even too heavy for the Long. Primer selection is simple: Small Pistol Standard. There are no loadings for any .32 that would require the use of a Magnum primer. Even with the .327, you aren't trying to ignite dollops of slow-burning powder. There is one situation that might be an exception: the .32-20 in a Thompson/Center Contender. Some smallbore metallic silhouette shooters use that combo, but the Contender is a single-shot handgun, and in that use it is best treated as a small rifle cartridge and not a handgun cartridge.

Powders for the .32s besides the .327 are simple: you pick a common one from the fast to medium burning section of the burn rate chart, and have fun. Titegroup, HP-38, Vihtavuori 320 and 330 are all powders I've had good luck with. Even the .32-20 is not

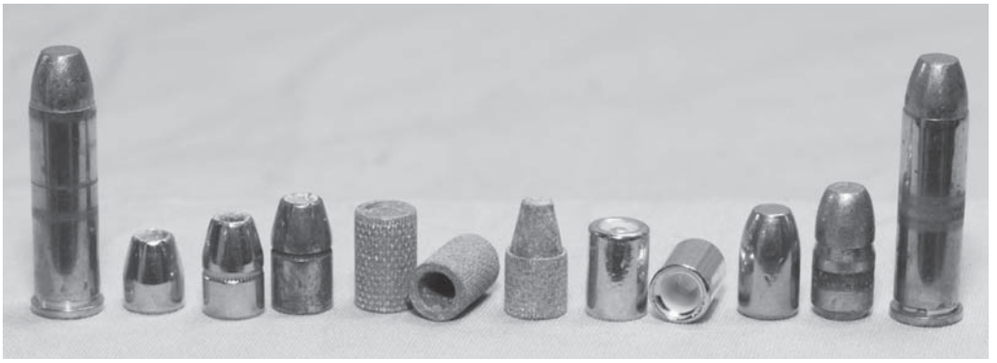
The 32-20, despite being nearly a century and a half old, still is useful. In mild loads, lead or plated. For stiffer loads (depending on the sturdiness of the handgun used) you can go with jacketed and get some velocity. It is not, however, a .327, so don't try to make it one.

The current vogue is to put the .327 into compact guns, like this S&W J-frame.

big enough to warrant trying slow burning powders (and their larger charges) to increase velocity. One avenue that might bring good results is to use a medium burn rate powder with lead bullets. As in the 9mm, I have found some .32s to be a bit touchy when I combine lead bullets with fast powders. When I get patterns rather than groups, and the throat and bore dimensions are correct, I have found that going to a powder of HP-38 or slightly slower restores accuracy. My investigations have left me with the conclusion that some guns do not do well with lead bullets and fast powders because of the base softening or melting. Many guns don't care, but some 9mms in particular, and some .32s, do. When I run into those, I change powders. Powder charges in the smaller .32s can be very touchy. Keep in mind scaling and proportion; a .1 grain change in a powder charge of 10 grains for a .44 Special is only a one percent change. That same .1 is a five percent change in a 2.0 grain charge of powder in a .32 Short. Do not make big changes in powder charges when developing loads for any .32, and always use a chronograph to keep track of things.

An example from the past, in a different caliber, can show you what I mean. I showed up at the gun club one afternoon to practice for Second Chance. Bruce Britt was there, breaking in a brand-new Les Baer Government Model. He was using a new bowling pin load. "It seems a bit stout, but it takes pins off the table with gusto." I tried a few rounds, and it was stout. I convinced Bruce to run a few rounds over my chrono. We discovered that his "stout" pin load was a 255 grain hard-cast semi-wadcutter going 898 fps. Now, if you were to load a .32 Short or Long until the recoil seemed stout for a .32, where would you be? And would your century-old pocket revolver offer you the strength margin that a brand-new 1911 would? Answers: You'd be on the ragged edge, and no, it would not offer you much margin at all.

Pressure limits in the .32 family are all over the place. At the bottom end we have the



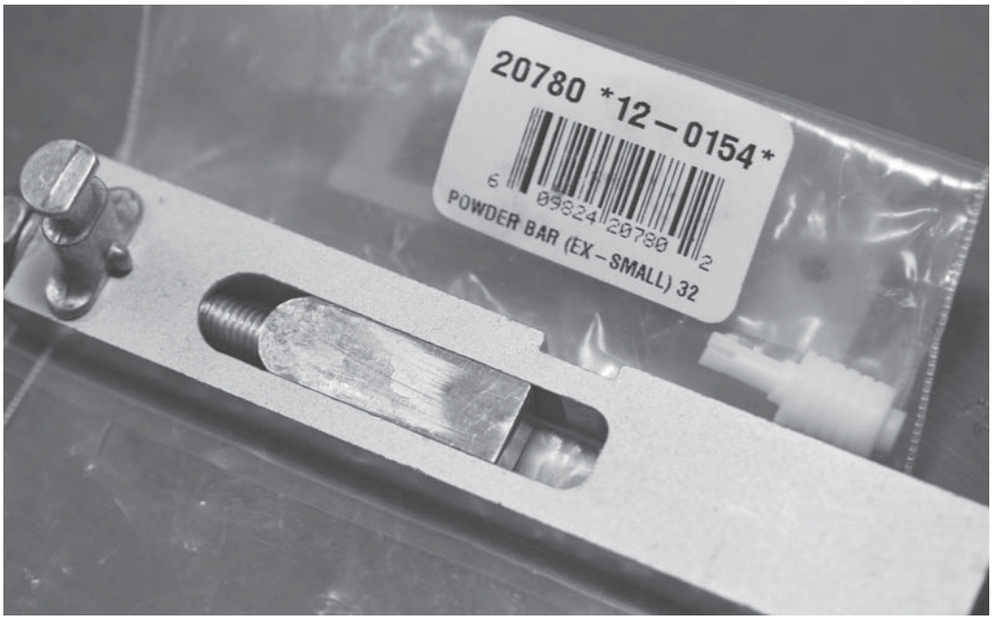
While it started life with handicaps, the .32H&R is a useful cartridge. If you have one of the very cool S&W M-16 revolvers, you have a perfect learner's wheelgun.

.32 doesn't always mean the same. Be sure your ammo properly matches your handgun.

Today you have many choices for loading your .32, from 60 grain JHP screamers, to stout-loaded 115 grain bullets, and even mild plinkers such as the HBWCs we see here from Berry's.

Short and Long, with pressure limits in the 12,000 PSI range. In the middle is the .32-20. Above it is the .32 H&R Magnum, at 21K psi, and topping them all is the .327, at 45K psi. However, both the .32 Long and the .32-20 have been (and in the case of the long, still is) loaded to two different pressures. The .32-20 used to be made in two loads, one the lower pressure for use in handguns and the higher pressure for rifles. And the boxes of rifle ammo were clearly marked as not suitable for use in handguns. The Long is loaded to a higher level in the wadcutter ammunition. Unlike the .38 Special, where the wadcutter load is usually lower pressure for reduced recoil, the .32 Long wadcutter is often loaded to a higher pressure than the standard so the ammunition will reliably cycle the pistols chambered for it. That's right, pistols. In much International target competition, "centerfire" means .32, and there you'll find ferociously expensive target pistols in .32 Long Wadcutter. So don't pick up a box of .32 wadcutters expecting a softer load for plinking.

Which brings us to use. Just what the heck would you use a .32 for? The same things you'd use any other caliber for: competition, defense, hunting, practice. In competition, the .32s have had a resurgence. There is no power factor used in Cowboy Action, only a velocity ceiling to preclude target damage and bouncebacks. As long as your bullets are under 1,000 fps and made of lead, you're good to go. An SAA chambered in .32 Magnum or .32-20, with a 115 grain cast bullet under 1,000 fps is going to be a speedy shooting iron. You may get some razzing from other cowboys, but then again you may not.



One big obstacle to loading the .32s is dropping a small-enough powder charge, consistently. Dillon makes a special low-weight charge bar just for them.

Remember, right after .44-40 and .45 Colt in volume production came the .32-20. It is a real cowboy cartridge. The International Confederation of Revolver Enthusiasts have a power factor threshold. You can't shoot an ICORE match unless your load meets or exceeds 120 PF. In practice that means a 115 grain cast bullet at 1043 fps, which is just above the loading limits in all loading manuals for .32-20 or .32 H&R. However, the pressure limit for the .32 H&R Magnum is 21K psi, meant for the less-than-sturdy H&R revolvers no longer being made. A number of ICORE shooters feel comfortable exceeding that by a small margin in their much sturdier S&W revolvers to make the power factor. For defense, while a .32 may not seem like much, it is better than harsh words and even a size 14 boot. An 85 grain Hornady XTP at 1100 fps won't get the attention of the FBI ammunition selection board, but it will get the attention of a would-be miscreant if you slap it through his sternum. Combined with a lightweight snubby from S&W, the .32 Magnum can be an extremely convenient, if light in impact, defensive weapon.

For hunting, an accurate .32 is up to the task of small game. I'd have to be really lost, starving, desperate and out of cell phone range to use a .32 on a deer. But in an emergency you could. Someone might ask why a .32 could be suitable for defense but not for hunting. In a defensive situation, if the bad guy I just shot wishes to flee the scene I'm happy. If, however, the deer I've just shot to try and keep from starving flees, then I'm still starving.

For practice, the low cost of reloads and light recoil of light bullets can lead to lots of practice and improved skill. The .22LR is the least expensive ammo you can buy, but many shooters find it difficult to take the rimfire seriously for practice. They need a "real gun" to improve their skills. You can load .32 for less than even 9mm can be purchased, and you can also tailor it to your needs. If you want to work on your skills for ICORE or Cowboy Action, you can load buckets of ammunition in any of the .32s for less than $75 per

thousand rounds. If you are bringing a new shooter into competition or simply want a "step up" from the .22LR, then a light-load .32 will be an easy step, before going on the bigger calibers.

For testing, I had an embarrassingly large number of .32s to call on for someone who has been very snobbish about shooting .45s. The .32-20 I used was my own S&W M&P dating from 1916. For the .32 H&R Magnum, I used a Ruger SP101. And for the .327 Federal Magnum, I checked velocities in that Ruger and an S&W pro Series ported J-frame.

.32 H&R Magnum

Bullet	Powder	Weight	Velocity
78 Oregon Trail RN	Titegroup	3	947
78 Oregon Trail RN	WW-231	3.3	959
78 Oregon Trail RN	Unique	3.5	909
83 Berry's HBWC	Titegroup	2.8	897
83 Berry's HBWC	WW-231	3.2	921
83 Berry's HBWC	Bullseye	2.5	861
90 Hornady HBWC	Titegroup	2.8	843
90 Hornady HBWC	WW-231	3.2	903
90 Hornady HBWC	Bullseye	2.6	839
85 Hornady XTP	HP-38	3.5	963
85 Hornady XTP	Autocomp	4.6	1113
85 Hornady XTP	HS-6	5.6	1157
85 Hornady XTP	Lil'Gun	12	1249
100 Hornady XTP	WW-231	3.7	923
100 Hornady XTP	Autocomp	4.2	947
100 Hornady XTP	Lil'Gun	11	1199
100 Hornady XTP	HS-6	5.3	1007

.327 Federal Magnum (For reduced loads, use .32 H&R Magnum data)

Bullet	Powder	Weight	Velocity
85 Hornady XTP	Titegroup	5.6	1372
85 Hornady XTP	WW-231	6	1383
85 Hornady XTP	HS-6	8.3	1441
85 Hornady XTP	Longshot	7.1	1494
100 Hornady XTP	HP-38	5.2	1221
100 Hornady XTP	Autocomp	6.1	1299
100 Hornady XTP	HS-6	7.5	1314
100 Hornady XTP	Longshot	6.5	1351
115 Oregon Trail FP	Titegroup	4.5	1121
115 Oregon Trail FP	WW-231	5.2	1189
115 Oregon Trail FP	Autocomp	5.5	1178

.32-20

Bullet	Powder	Weight	Velocity
71 Berry's RN	Titegroup	3.2	1048
71 Berry's RN	WW-231	3.8	1047
115 Oregaon Trail FP	Titegroup	3	849
115 Oregaon Trail FP	WW-231	3.5	891

Chapter Thirteen

.38 SPECIAL

Of all the common handgun cartridges in use today, the .38 Special is the oldest. Wait, let me amend that. Of all the common cartridges that you will encounter outside of a Cowboy Action Shoot competition, the .38 Special is the oldest. At the end of the 19th century, the double-action revolver was being perfected. There had been double-action revolvers for several decades by then, but the earlier designs were not noted for durability. The Smith & Wesson company, unveiling their Hand Ejector model, created a revolver that lives today. When? 1898. Why "Hand Ejector?" Simple, there had been top-break revolvers, where the process of opening the action automatically worked the extractor star and ejected the rounds. They were know as "autos" or auto-ejectors.

The new model required that you perform the ejection operation yourself, thus the hand ejector name. It first appeared in .32-20, but the next year it was available in the new S&W chambering, .38 Special.

The .38 was a common size back then. The .38 S&W, the .38 Short Colt, .38 Colt and others were all known. The .38 Special improved on them, marginally, but back then, even a small amount was a lot, if it was all there was. As a comparison, the .38 Colt fired (and these are all nominal figures, as production lots varied) a 150 grain lead round-nosed bullet at just over 700 fps. The new Special fired a 158 grain LRN at nearly 850. Woo-hoo!

The .38 Special was longer than any of the others. This was not, as some have assumed, to hold more powder. By 1898, no one who was designing cartridges assumed they would be using black powder. In fact, for the fast (and then, only) pistol powders available, the .38 Special is perhaps a bit too large, too capacious.

One of the most commonly, and highest-volume, reloaded cartridges extant, the .38 Special is a dream to load and has no bad habits.

No, S&W made the new case longer for a simple reason: It would not chamber in older guns. It may sound cold and calculating, but why come out with a new gun and round, and arrange things so anyone who wants to can get the new round into an older gun? Arrange things so you can sell guns, too.

That greater length made it possible for us, decades later, to use newer, bulkier powders, to boost performance without exceeding the pressure ceiling of the Special.

In 1898, the .38 Special was chambered in full-sized or bigger guns. An S&W N-frame, the .44 frame, chambered in .38 Special, today seems like an excessively big gun for a sedate cartridge. Back then, not so much. Today, however, we're used to thinking of the .38 Special as a concealed carry cartridge, and thus chambered in lightweight guns. Where the old .38-44 Outdoorsman would tip the scales at 42 ounces, today anything over 20 ounces in a carry gun is too close to being an anvil for many people, especially if it is chambered in the "lowly" .38 Special.

The .38 Special is amazingly accommodating to the new reloader, and thus you must be diligent to avoid bad habits. Given its low operating pressure, it resizes with low press handle force, and components are to be found everywhere. You could go into just about any gun shop that stocks even the most modest array of reloading supplies, and find enough to load up .38 Special ammo.

The crimping requirements of the Special are so generous that what works reasonably well for it might not work at all, let alone satisfactorily, in other calibers. For accuracy, modest recoil and unpretentious getting-the-job-done work, it is hard to beat the .38 Special.

THE 2.7 PHENOMENON

Back when revolvers were all you saw on the PPC line, the standard load was a 148 grain, hollow-based wadcutter, loaded over 2.7 grains of Bullseye. The combo poofs the bullet out of the six-inch barrels commonly used there, at the modest mid-600s fps-wise, and the low recoil and accuracy (along with the neat, clean hole punched in the target, hence the term "wadcutter") meant it was the load you used, saw or heard about on the competition line. When I was shooting PPC (with a .45 Auto), the "2.7 and 148" load was so common it wasn't unusual for shooters to know of only three loads for the .38: the 2.7/148, any and all "158 round nose" and "hollowpoints." That was the sum total of their ballistic knowledge of the .38 Special, which explains a lot of confusion in technical matters.

The typical pressure of this load is around 8,700 psi, where the maximum allowed for the .38 Special is 17,000 psi.

And, since it was ubiquitous, when a gun blew up, the question was asked, "What were you using?" The answer, "wadcutters and 2.7." From that, it became an article of faith that there was something about the combo that was dangerous. That the cartridge might take it into its head to not just fire, but explode, if you were unlucky. Actually, no. What was dangerous was the huge volume of reloaders loading the combo, and the resultant effect of carelessness, sloppy loading or just plain not paying attention.

The NRA investigated. What they found was interesting. First, if you were an inattentive reloader and you dropped a double-charge of Bullseye into your case, there was room for it. It would fit without undue pressure on the press handle to seat the bullet, and the resulting pressure and recoil would

My ICORE revolver which, despite being a .357 Magnum, sees only .38 Special ammunition.

be very unpleasant, with testing showing a pressure on the order of 32,000 psi. Ouch. But what really sent pressures through the roof was incorrect bullet seating. If you were to seat the bullet (usually flush with the case mouth) just an eighth of an inch deeper, the pressure could double from the usual 8,700 to nearly 18K. Not a big deal, right, since the typical 148/2.7 combo was running not very hot and doubling it still left it within the realm of normal .38 Special pressures?

Perhaps.

But seat it a bit deeper and throw a double charge and you could end up with something in the 50,000+ psi range. Guns not built for magnum pressures really don't like being subjected to it, and protest. Grossly exceeding magnum pressures is a quick route to failure. How can you avoid the fate of blowing up your gun? Well, the simple solution was

Yes, a seven-shooter, and a tack-driver with .38 Special reloads.

the one found back then: certain brands of progressive reloading presses (none of which are made today) were found to be easily mishandled, and produce double and triple-charged cases. The presses made today are not like those.

Pay attention to your loading, Use a powder-checker. And inspect your ammo.

BULLET PULL

Really hot loads in really light guns (in particular, the .38 Special, and more so in the .357 Magnum) can experience bullet pull. When you shoot, the revolver (we'll assume a revolver here) jerks back. The bullets get snatched along for the ride. If the neck tension is not great enough, they pull out of the cases a bit. The sixth one will be noticeably longer than when it started.

We didn't see this much in the past, but with so many more lightweight guns around (a 12-ounce .38 Special or a 15-ounce .357 Magnum, for example) it has become more of a problem, so much so that S&W marks the barrels on some of their revolvers to warn owners of the potential problem.

BULLET DIAMETER, ETC.

The bullets you'll be using here are the normal .38/.357 bullets: .357 inch for jacketed, and .358 inch for plated and cast. There really is no need to go trying other diameters, as larger diameter bullets will only be needed in some very rare instances. If you happen to have a revolver with mis-matched chamber throat diameters and bore diameters, they may help. If the chambers have leade diameters above .358 inch, going larger might help accuracy. Shooting .358-inch lead bullets out when the chamber throat/leade is .360 or .361 inch can lead to leading and poor accuracy. However, such combos are rare in this caliber.

At the other end, using 9mm diameter bullets isn't helpful unless you find you have a huge or free supply of them. I experimented with them when I had a truckload of 150 grain .356-inch lead bullets for 9mm/.38 Super. What I found was that they worked fine as long as I used a 9mm diameter expanding die on the powder drop station of my Dillon 550.

The expander was the correct diameter for the bullets and short enough that the case was not expanded for the bullet down the full length the bullet entered the case. I had sufficient neck tension to properly hold the bullet. Once the bullets were gone, there was no need.

Except for extreme cases, lightweight revolvers with heavy-bullet, full-power +P loads, crimp is not a big deal in the .38. It is forgiving enough you might even find you are a bit too casual in your settings when you move to another caliber.

MINOR

While the .38 seems like a softy compared to later, magnum calibers, it can deliver all you need for many competitions and carry. There are three Minor levels you have to keep track of: USPSA, ICORE and IDPA. For USPSA it is 125 PF, for ICORE it is 120 PF, and for IDPA it is 105 PF. IDPA is easy, as there are a host of loads for the .38 that make it. The USPSA and ICORE Minor power levels will require you move a bit into +P territory for the .38 Special.

.38 Special Reloading data, 4" S&W M-28

Load	Powder	Weight	Velocity	Power factor
125 Star	WW-231	4.7	899	122
125 West Coast P-RN	Titegroup	4.6	873	109
125 West Coast P-RN	Titegroup	5	1009	126
125 West Coast P-RN	Bullseye	4.4	920	115
125 Oregon Trail L-RN	WW-231	4.4	925	116
125 Hornady XTP	HP-38	5.1	975	122
125 Rainier FP or HP	Titegroup	5.1	1012	126
125 Rainier FP or HP	HP-38	5.3	1020	127
125 Rainier FP or HP	VV N-320	5.2	1027	128
125 Berry FP	Titegroup	5.1	999	124

125 Berry FP	HP-38	4.6	1029	128
125 Berry FP	Bullseye	4.5	979	122
125 Berry FP	Autocomp	6	1089	136
148 Oregon Trail DE wadcutter	Bullseye	2.7	750	111
148 Berry HB Plated wadcutter	Titegroup	2.9	775	115
148 Berry HB Plated wadcutter	WW-231	3.1	710	105
148 Rainier DE wadcutter	Titegroup	3	810	113
148 Rainier DE wadcutter	VV N-320	3.2	830	123
148 Rainier DE wadcutter	VV N-320	3.6	880	130
147 Durocast*	AA#2	3.8	774	114
147 Rainier*	Bullseye	3.7	773	114
147 Rainier*	Bullseye	4.3	879	129
147 Durocast*	WW-231	4.7	899	132
158 Rainier FP or HP	Titegroup	3.6	822	130
158 Rainier FP or HP	VV N-320	4.4	847	134
158 Rainier FP or HP	HP-38	4.6	816	129
158 gr LRN Oregon Trail	AA#2	3.9	823	130
158 gr LRN Oregon Trail	Titegroup	3.4	810	128
158 gr LRN Oregon Trail	Bullseye	3	747	118
158 gr LRN Oregon Trail	WW-231	4.5	825	130
158 gr LRN Oregon Trail	HS-6	5.9	821	129
**These are 9mm bullets, with diameters of .356". They work fine and shoot accurately in my revolvers. However, to have proper meck tension you must use a 9mm-diameter belling stem or a .38 Special one polished down to .351".*				
Comparators, factory loads;				
110 Silvertip Winchester			854	94
110 gr JHP Winchester+P+ "WCC88"			1090	120
110 gr JHP IMI +P+			1133	124
125 gr JHP Winchester +P			903	113
125 gr Remington Golden Saber			945	118
130 FMJ Winchester			782	102
129 Federal Hydrashok			848	109
148 Federal Match Wadcutter			675	100
158 FMJ Speer Lawman			797	126
158 FMJ Speer Blazer+P			852	134
158 LRN Remington Target			725	114
.38 Special Chronograph results, +P loads				
Note: for use in modern revolvers in good condition. Not for use in aluminum-framed guns. Start below and work up.				
125 Hornady XTP	WW-231	5.2	992	124
125 Hornady XTP	HS-6	7.9	1050	131
125 Hornday XTP	Unique	5.5	1024	128
158 Hornady XTP	HS-6	6.8	890	140
158 Speer JSP	3N37	6.4	942	148
158 Speer JSP	AA#5	6	909	143
158 Speer JSP	Unique	4.5	891	140
180 L-TC Oregon Trail **	Bullseye	3.3	920	165
180 L-TC Oregon Trail **	VV N-350	5.5	916	165

Photo Courtesy Bill Wilson

Chapter Fourteen

.38 SUPER

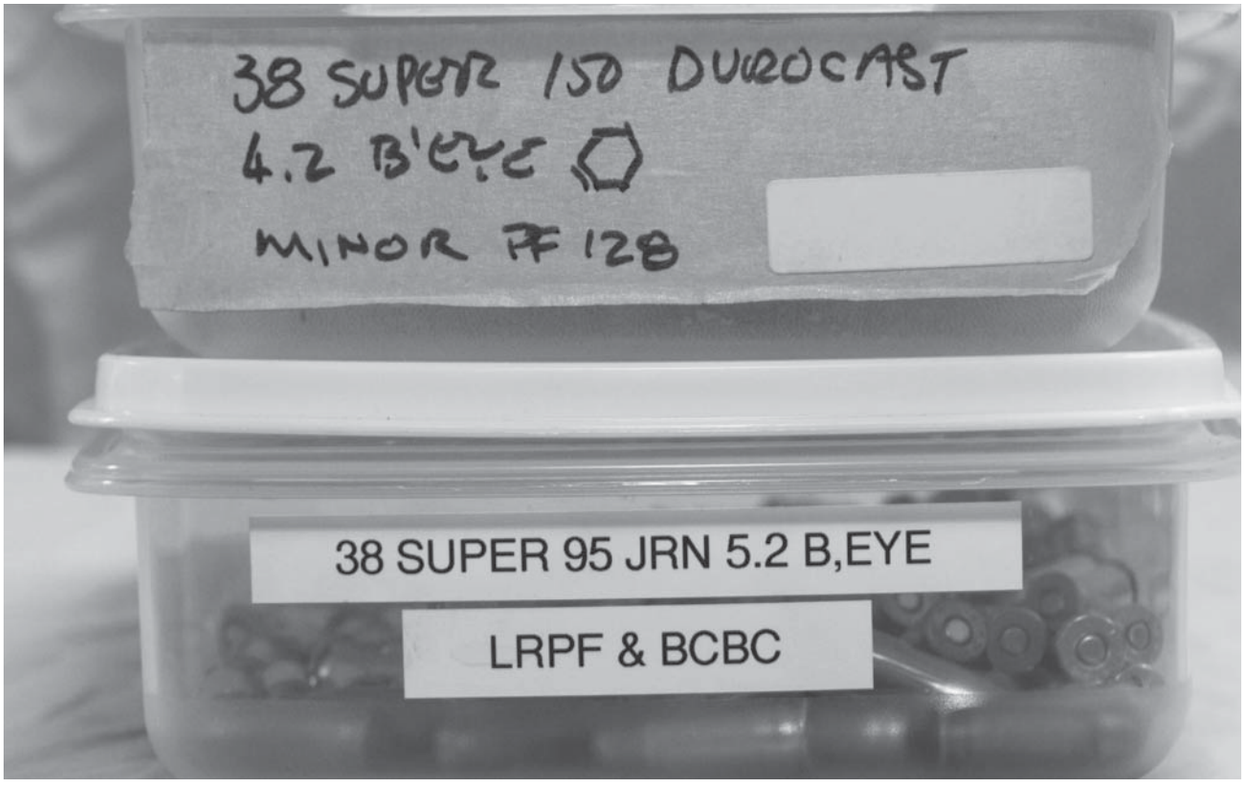
The beginnings of the Super date to the very start of Colt, John Browning and self-loading pistols, the turn of the 19th into the 20th century. The M1900 Colt pistol was chambered in a new cartridge, designed by Browning: the .38 Auto. The original specs were as good as anything then, a 130 grain fully-jacketed bullet, at 1100 fps. Anything more was too much for the rather delicate M1900 and its descendants. One quirk of the .38 Auto that has carried to this day is the rim. It is a semi-rimmed case with a rim that actually sticks out of the case diameter by a few thousandths. Other than that, the case itself is a dead-straight cylinder, not tapered like the 9x19.

In 1929, Colt came out with the Super .38. It was the same case, chambered in the 1911A1 (you wonder what took them so long) and boosted to 1300 fps. And they probably could have done more, but that was probably the limit of what the old M1900 could do and not come apart on the first shot if someone mixed up the two loads. (If only Colt had made the case just a bit longer, so it wouldn't fit the 1900, but oh well.)

The Super .38 had a bright future until S&W stole all the thunder with the .357 Magnum in 1935. After that, the Super languished until the 1980s. Post-WWII, the name was changed to .38 Super, and by the 1980s it was seen in any numbers only near the Mexican border. Then, a couple of IPSC shooters by the names of Leatham and Enos picked it up, boosted it to make IPSC Major (by then, a "mere" 175 PF) and fed it into compensated 1911s.

The initial loads used then were hard-cast lead round-nosed bullets of 160 grains or so, and to make Major you had to boost them to a minimum of 1094 fps. The powders then could just barely do it, but since then we've gotten many more-suitable powders to choose from.

And since then, it, or a variant of it, has been a staple of USPSA/IPSC competition. While some still advocate 9mm Major (and you have my stand on that in the 9mm chapter), the Super, in one form or another, still reigns. There was a movement to the 9mm in 1911 pistols for a while, based primarily on the then-inexpensive 9mm ammo available.



The .38 Super is easy to load, being a straight-walled case. It allows light loads like these Steel and practice loads.

Now, it depends on what you have and what you need. If you have a 9mm pistol (1911 or other) and no pressing need for Major, you'd be best to stick with it and load lots of 9mm.

If you have a .38 Super and you need ammo of any kind, then reloading is what you do. And for that, you need two different levels of power.

On the low end, you need IDPA/Steel Challenge ammo. There, a 125 PF is your goal, and for that you can pretty much substitute 9mm load data into your .38 Super cases and go with it. For the Steel Challenge that will do, and you finish the task by tuning your load for accuracy. If you're shooting IDPA with a Super, you must have a chronograph and make certain you match or exceed the Power Factor for your Division.

There used to be a lot of struggle, controversy and head-scratching over what bullets to use. The original Super was a .3565- or .357-inch diameter bullet cartridge. If you find a half-century old box of ammo and pull the bullets, they may well have one of those diameters. Today, everyone – barrel makers, bullet makers, brass makers and loading die makers – assumes your Super will be content with .355-inch jacketed bullets. That's right, 9mm bullets. And they'll most likely be right.

Once you find the right load (and the pistols of today are much more forgiving than a generation ago) you will be rewarded with brilliant accuracy and long case life. The case life at Major might be shorter, but I have a bin full of Super brass that I have shot in my USPSA/IPSC Open guns, and they have each had multiple loadings without a problem. The trick is to use the slowest-burning powder you can get a full charge into the case without

spilling. You want it slow for several reasons; lower peak pressure, and greater pressure at the compensator.

If you are not loading Major, then you want the smallest amount of fast-burning powder that works the gun and shoots accurately.

Like so many others, Super brass is not worth trimming. You use a taper crimp and standard small pistol primers, and load by the bucket-full.

More so than many other cartridges, the Super deserves a bit of info on pressure. It runs at the same pressure as the 9mm, various magnums and the .40 S&W, right in the mid-30,000 psi range. (They have differences of a thousand psi, plus or minus, no big deal in the scheme of things.) Some shooters and loaders have worked up their favorite loads, recipes that deliver the velocity they desire and use the components they have on hand. They comment, "I don't have any pressure signs, and my brass lasts a quite a while." As I've mentioned before, looking for pressure signs in a handgun load is like depending on faery dust to keep you safe. It is an illusion.

Modern cartridge brass and primers do not show "pressure signs" until they are well into the 60,000 psi range, some even more. If someone tells you (and this is for illustration, not a course of action I suggest), "I use small rifle primers, to control pressure," be careful. You see, what they're doing is masking the signs of the excessive pressure they are already experiencing. If someone says that to you, move away on the range. Do not borrow any ammo from them.

While the Super can out-do the 9mm Parabellum in performance, it does not do so by means of some extra pressure margin that is available to you. No, you get more velocity through extra case capacity, which permits more weight of a slower-burning powder, powder that keeps you under the standard pressure limit.

What you can get, however, is the actual performance of a .357 Magnum out of a four-inch revolver barrel. Most .357 Magnum fans love to quote velocities measured from six-inch barrels, but the four-inch is what you'd most likely be carrying. And a commander-sized .38 Super, compared to a 2-1/2-inch magnum barrel really isn't fair. As in, not fair to the snubbie, as you'll find it slower than the Super.

As with all things, you get what you pay for, and you pay for what you get. You'll get more velocity, but you'll also get more recoil, and in some loads a lot more muzzle blast. At a match like the USPSA Limited/Production nationals, you'll find (just as an illustration) that you can be fifty yards from the firing line and do away with your hearing protection. Distance has provided a sufficient buffer. The same distance from the firing line at the Open Nationals (where there will be scads of .38 Supers in use at Major power levels) will require hearing protection. They are that much louder.

Look over the loading data and you'll see that in some instances you're using twice as much powder to gain a few hundred feet per second boost. You want it, you can get it, but you have to be willing to pay for it.

SUPER VARIANTS

Practical shooters, being hyper-competitive types, look for any advantage, real or imagined. As a result, there are a whole host of near-Super cases, variants of one kind or another, to be found. One is the .38 TJ, de-

signed by Todd Jarrett. It makes the rim the same diameter as the case body, and the rim recess larger for a better extractor purchase. The lack of a protruding rim makes it feed better in double-stack magazines. There is the 9x23, the Winchester attempt to improve the .38 Super, which they do, but at a higher pressure. This one has the base and rim of the 9mm Parabellum case, but lengthened from 19 to 23mm. .38 Super Comp is another rimless straight case from Starline. There have been rimless variants from Hornady and Lapua as well.

There were also variants that worked off the .38 Super length, but started with a 9mm Parabellum-type rim. The 9mm Largo is a

The Super can be loaded in a plain gun (the Colt on top) for IDPA, single Stack and Steel. Or it can be loaded stout, for use in the Open gun below.

Spanish product, and chambered there in a host of guns. It might well be the starting point for the Winchester 9x23, as it is also known as a 9x23, but at much lower pressure. There is apparently enough demand for the ammo that CCI/Speer makes an aluminum-cased Blazer version of the 9mm Largo.

What all this means is simple; more so than any other cartridge you load for, you will have to be diligent in sorting found brass. If you show up at the gun club the day after a USPSA match and find a treasure trove of brass left behind, you will be all day sorting it out. Once you get the standard stuff sorted (the .45 ACP, .40, 9mm Luger and the odd .38 Special) you'll find that the "looks like Super" brass can be any or all of the above, and some others besides.

Sort carefully and keep the stuff separated. One over-sized case in your .38 Super brass stream, fed into your resizing die, will stop your press cold.

BRASS LIFE

Back in the early days of IPSC experimenting with the Super, we'd find some loads really toasted brass. But, the days of compressing a big charge of some unsuited powder into the case to make Major are gone. We now have powders much better suited for the job, and as a result, if you load properly brass life depends on only two things. One is the size of your chamber. A loose, sloppy chamber will over-expand brass, and when re-sized it will work-harden and crack prematurely. Second, in how clean your operation is. Some guys like to brag that they don't invest any manly status in shiny brass. "I just knock the mud off, and size 'em." That grit will ruin your dies, scratch your brass and lead to early cracks.

Crimp for the .38 super, as it uses 9mm bullets, is the same as 9mm. (You'd think that would be simple and obvious, but it isn't to some.) Also, the belling stem diameter is 9mm as well. For all loads, a small pistol primer, standard, is just fine. Yes, there are some slow-burning powders that you might consider a small pistol magnum primer for,

Loading light or stout is easy: light bullets for soft loads, and heavy bullets for stout ones. A 151 grain Rainier plated bullet, at nearly 1200 fps, is stout in anyone's book.

but the Super case isn't so capacious that you really need the extra oomph of the magnum primer.

The Super can run with bullets in the full 9mm weight range, plus some heavies as well. A 9mm will struggle to work with weights of 160 grains or a bit more (unless you load them to .38 Super overall length) but the Super handles them just fine. Back when the Second Chance match was still going on, we needed handguns on the back range to shoot the stop plate in the light rifle and the shotgun slug events. For that, I loaded 90 grain bullets, meant for the .380 Auto, in my .38 Super. I only needed to squirt them out at 1200 fps to be certain of knocking over the stop plate. I had low recoil and short lag time from trigger press to plate fall. You may joke about it, but 100 fps difference in a load, with a stop plate at 15 yards, means a hundredth of a second. Events were won or lost by not much more than that.

When we did the long-range handgun event there for a couple of years, I used my .38 Super and 150 grain bullets at Major. Yes, the recoil was stout, but it was an accurate load, and even clipping the edge of the plate at 90 yards with that load took it down.

.38 Super loads, in 5" Colt 1911 except where noted

Weight	O.A.L.	Powder	Weight	Velocity	Power Factor
Soft-Minor: ICORE, USPSA/IPSC, IDPA, Steel Challenge					
115 JHP	1.245"	Titegroup	4.6	1102	127
115 Horn-XTP	1.245"	HP-38	4.8	1149	132
115 Horn-XTP	1.245"	VV N320	4.2	1141	131
115 Horn-XTP	1.245"	VV N330	4.7	1110	127
115 Berrys	1.245"	VV-320	4.5	1151	132
115 Berrys	1.245"	Titegroup	4.7	1139	131
125 LRN	1.275"	Bullseye	4.2	1031	128
125 LRN	1.275"	WST	3.9	1030	128
125 LRN	1.275"	Titegroup	4.1	1021	127
124 Berrys RN	1.275"	Titegroup	4.2	1009	125

124 Berrys RN	1.275”	WW-231	5	1075	133
125 Oregon Trails RN	1.290”	Titegroup	4.4	1099	
125 Oregon Trails RN	1.290”	Bullseye	4.2	1031	
125 Oregon Trails RN	1.290”	WST	3.9	1030	
124 Berry’s RN	1.290”	Titegroup	4.4	1078	
124 Berry’s RN	1.290”	Bullseye	4.2	1019	
124 Berry’s RN	1.290”	WST	4.1	1029	
124 Berry’s RN	1.290”	VV-320	4.4	1039	
147 Oregon Trails FP	1.270”	Bullseye	3.6	857	
147 Oregon Trails FP	1.270”	Titegroup	3.8	904	
147 Oregon Trails FP	1.270”	WW-231	4.5	947	
147 Oregon Trails FP	1.270”	VV-340	4.7	1009	
147 Duro-Cast	1.210”	Titegroup	3.5	892	131
147 Rainier RN	1.275”	Bullseye	3.4	839	123
147 Rainier RN**	1.275”	Bullseye	3.4	879	140
147 Horn-XTP	1.260”	Titegroup	3.6	866	127
150 Berrys RN*	1.275”	Titegroup	3.7	905	135
150 Berrys RN*	1.275”	WW-231	4.6	1001	150
**The Berrys .38 Super bullets are .356” in diameter, but all modern Supers work just fine with .355” bullets.*					
Stiff-Minor, Bianchi cup					
130 FMJ**		Winchester White Box	unk	1155	150
125 Horn-XTP	1.200”	Titegroup	4.9	1101	137
125 Horn-XTP	1.200”	WW-231	4.8	1090	136
115 Horn-XTP	1.245”	HP-38	4.9	1179	136
115 Horn-XTP	1.245”	Viht N320	5.2	1232	141
115 Hornady XTP	1.245”	Autocomp	5.8	1168	
115 Hornady XTP	1.245”	HS-6	7.9	1223	
115 Hornady XTP	1.245”	Longshot	6.6	1231	
124 Hornady XTP	1.220”	VV-340	5.8	1164	
124 Hornady XTP	1.220”	SR-4756	6.9	1201	
124 Hornady XTP	1.220”	HS-6	7	1199	
Duty-equivalent loads					
125 JSP	1.250”	HS-6	7.3	1203	150
125 JRN	1.250”	VV N-340	6.1	1207	151
125 JRN	1.250”	Longshot	6.4	1211	151
147 Hornady XTP	1.260”	WW-231	4.5	972	
147 Hornady XTP	1.260”	Autocomp	5.2	1021	
147 Hornady XTP	1.260”	Longshot	5.6	1064	
Major, USPSA/IPSC***					
125 Horn FP	1.260”	Viht N350	7.5	1348	167
135 Nosler IPSC	1.265”	LIL’Gun	12.3	1248	168
140 Horn-XTP	1.210”	Viht-N-105	7.4	1197	167
147 Duro-cast	1.210”	WW-540	7.3	1131	167
147 Horn-XTP	1.245”	Viht N340	5.8	1147	168
147 Horn-XTP	1.245”	Viht 3N37	6.7	1191	175

*** Not nearly accurate enough for Bianchi Cup competition, but useful as practice and to generate empty brass.*

**** Using a 6” barrel 1911 instead of a 5” gains 40 fps and 13 PF.*

**** Every IPSC Racegun is different. Start well below this data and work up. You must use a chronograph when developing IPSC Major loads.*

Chapter Fifteen

.40 S&W

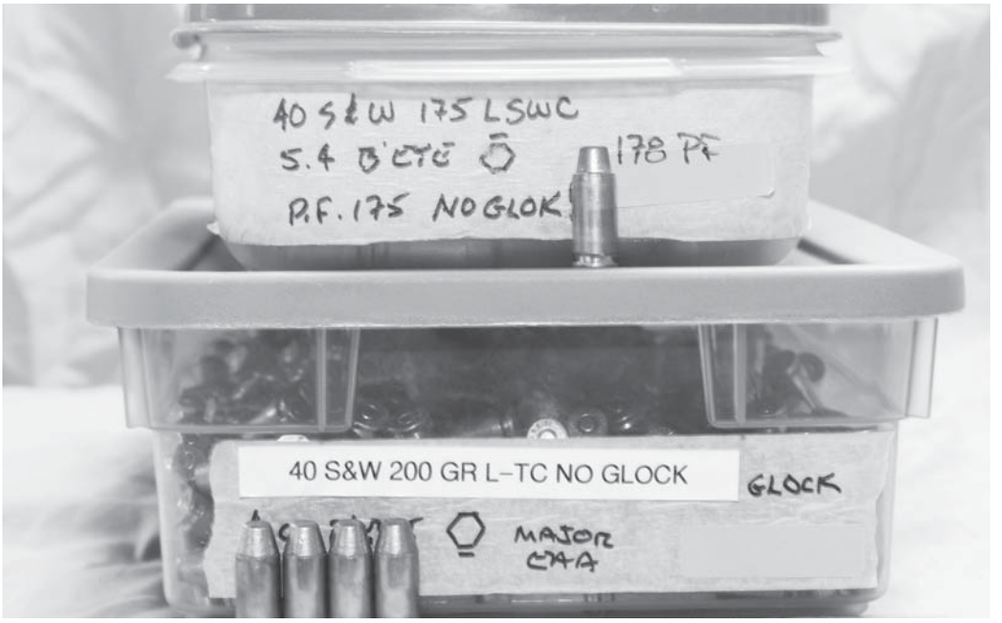
Derided by some as the "Forty Short & Weak," it is so only compared to the original: the 10mm. And since the 10mm was too much for many FBI agents, the .40 had to do, and it does the job very well. The idea was simple (and began back in the mid-1970s): make a 9mm-length pistol round that was bigger, but not too big. To split the difference in size and capacity between 9mm and .45, a .400-inch bullet got selected.

The test gun in 1973-4 was a Browning Hi-Power, and the cases were cut-down .30 Remington brass using jacketed .38-40 bullets. Whit Collins and John French used a Bar-Sto barrel, and the result was a 180 grain JSP, which they could boost almost to 1100 fps.

Fast-forward to the late 1980s. The FBI, having selected the 10mm as their new round, find they can't get people to shoot passing scores with it. (No surprise, as the original Norma load was a 200 @ 1200) So they load it down, and down, and down. Until Winchester, getting the latest specs the FBI wanted, realized that what the FBI wanted – a 180 grain JHP in a 10mm case – at 950 fps would have a lot of dead air in there. So why not shorten the case? Short enough front-to-back to fit into a 9mm magazine tube? Hey, it fits!

While the parent case, the 10mm, uses large pistol primers, the 40 uses small pistol primers. The neck expander diameter is the same, as is the crimp diameter. Why small pistol primers? Two reasons. First, the small-

On top, a typical USPSA/IPSC Limited gun, which uses the long-loaded 40SW. In the middle, an upper assembly to shoot International Modified. Bottom, an S&W M&P, which takes factory-length 40 S&W (and isn't bothered by lead bullets).



The big deal with loading the 40 is to keep your lead-bullet reloads out of Glock pistols. They hate lead, and have been known to object by breaking.

On the left, the standard 40SW length. In the middle, the longer length that many USPSA/IPSC competitors load their 40 to, to make for smoother feeding. On the right, the 10mm, the origins of the 40.

er case uses less powder than the 10mm, and thus didn't need as stout a primer. Second, the 40 was going to go into 9mm-sized pistols. A 9mm ejector is closer to the centerline than the 10mm, which was built on .45 ACP-proportioned pistols. Having the ejector too close to the big primer was just asking for trouble, so the designers went with a small pistol primer. Me, I would have done that too, and also gone to SAAMI and asked for the 10mm to get a small pistol primer pocket. It would have made things a lot easier. And, there was precedent. The .357 Magnum initially came with large pistol primers but got changed to small very soon after it was unveiled in 1935.

The .40 S&W came out in 1990. Some few early production batches had cases that were just a bit touchy about pressure. However, unless you're pulling dusty boxes off of the basement shelf, you won't be faced with that problem. You will, however, face other problems.

The .40 runs at the same pressures as the 9mm and .38 Super, and you should be aware that it is in the small group of handgun cartridges for which +P factory ammunition is not available. It is perhaps unique in being the only modern handgun cartridge that does not have, nor has ever had, a +P loading made for it. You see, the .40 is meant to fit into pistols designed for the 9mm, and when you carve a chamber and bore up from .355-inch bullets to .400 inch, you take out a bunch of steel. That means less of the usual very large

From 135 grains (left) to 200 grains (right, but not with fast-burning powders) the 40 can handle a wide range of weights.

margin of safety is cut away. Not that the .40 is unsafe, but you do not have the margins for error that you'd have in a 9mm.

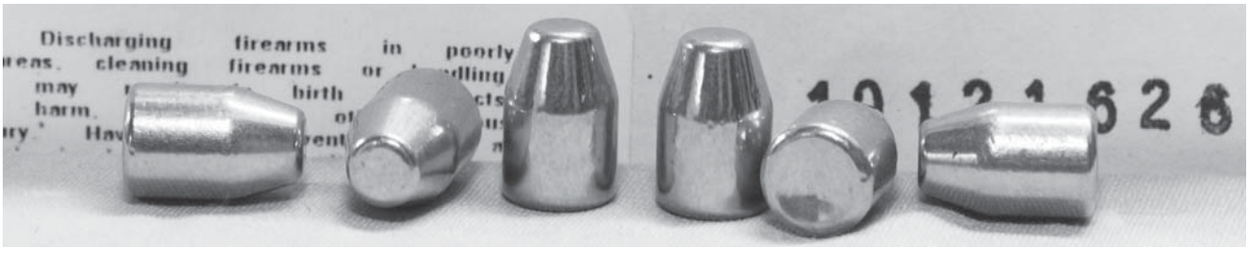
So that means you have to accept some limits.

One requires a bit of explanation. In practical shooting, you have to make Power Factor. In any given caliber, the "softest" (it is not really a measurable thing, but shooters can roughly agree on some things) is the one that uses the heaviest bullet and the least amount of powder to make Major. You see, the chrono measures bullet speed, but your wrist feels bullet speed and the jet of gases exiting the muzzle. The muzzle acts exactly like a rocket nozzle, and the gases are part of the recoil. The average velocity they exit at is around 4,000 fps. So a load that uses more powder will have more felt recoil, due to more gases exiting at 4,000 fps.

How big can this be? Let's assume we craft two loads that are exactly Major, with a 165 PF. So, we have a 180 grain bullet traveling at 917 fps. Taking a look at the available loading data, we can get that with two powders from either end of the spectrum, 700X and HS6. We get the velocity we need with 4.4 of 700X, and 6.6 grains of HS6. The math works out thusly: the 700X produces 165PF over the chrono, but a wrist-felt PF of 182. The HS6 load produces a chrono-read PF of 165, but a wrist-felt PF of 191. (Bullet weight times velocity, plus powder weight times velocity, for the wrist-felt PF.)

So, the softest-feeling load is one that uses less powder. Less powder, to make bullet velocity, means a faster-burning powder. But, in the 40, the extreme edge of performance is off-limits. To use the heaviest bullet, 200 grains, and the fastest powders, is to invite a

Going into +P territory quickly (and inevitably) leads to a busted gun.



The bullet weight most-used in the 40 is the 180 truncated cone. You could shoot the 40 for the rest of your life and not need anything else.

busted gun. Why? The fast-burning powder hits the pressure ceiling before you can make Major, and going into +P territory quickly (and inevitably) leads to a busted gun. A couple decades of shooting, and thousands of USPSA/IPSC experimenters trying 40 Major, have taught us that. If you must use 200 grain bullets, do not use the fastest powders. Since learning that, most competitors have settled on a 180 grain bullet, and that bullet weight is quite content to be safely launched to Major by any powder you can find on the shelves.

Another limit is lead. As in, you can't use lead bullets in Glocks. The Glock company doesn't even want you to use reloaded ammunition in their pistols, but lead is particularly bad for Glocks. The combination of the rifling shape, the bore diameter, surface friction and chamber shape produce leading in prodigious quantities. Leading increases pressure, and soon you have a busted gun. So, jacketed bullets only for your Glock. Non-Glock pistols, using traditional rifling, have no such problems. Glock pistols using aftermarket, non-Glock barrels are also okay with lead bullets.

Pistols originally designed for the .45 ACP, such as the many 1911 variants, might be touchy about over-all length (OAL). The short, 9mm-length .40 ammo might not feed well. If you are loading for a 1911 (like a hi-cap STI, Infinity or Para Ordnance) you'll have to "Enos-tune" your load. To do this, you load dummy rounds of longer than-normal .40 S&W rounds. Nearly to 10mm. Take the recoil spring assembly out of your pistol and hand-cycle the slide with the dummy rounds feeding out of your magazines. You'll notice that one length is markedly smoother in feeding than others. That's the length for your gun, provided it does not jam the bullet into the rifling. If you find that "long enough" for feeding is too long for the rifling, you'll have to have a gunsmith "long-leade" ream your chamber. Congrats, you have a tuned competition gun there.

To find the maximum loaded length your chamber will take, you need the barrel out of the pistol and cleaned. Take your dial calipers and measure the overall length of that bullet. Drop the bullet into the chamber of your barrel and press it gently forward. When it stops, measure the distance form the back hood of the barrel to the base of the bullet. Add the bullet length to the hood-to-base measurement, and that is as long as your barrel will allow that bullet to be loaded before hitting the front of the chamber or rifling.

The problem arises from the basic design of the .40 bullet: a cylinder topped by a truncated cone. To add weight, you make the cylinder longer. You can't make it heavier with a longer nose, the magazine length restricts that approach. So, a longer-loaded bullet has a lot more of the cylinder sticking out of the case.

When crafting ammunition for your competition pistol, the "correct" overall length of .40 ammo for your pistol is what it is. There is no "average" or "common" length. Once you go down the path of altered OAL, reamed leades, etc. for a competition gun, you have to craft your ammo to your pistol, and that means you have to check your ammo over your chrono.

OREGON TRAIL

There is, however, one way out of the box of the ".40 long load" dilemma. Oregon Trail, alone in the bullet-verse as far as I can tell, makes a long-nose .40 bullet of 185 grains weight. It is meant to be loaded into a .40 S&W case (not 10mm) but to 10mm length. It neatly side-steps the problem of long-loaded 40 bullets slamming into the chamber ledge or rifling leade of a standard chamber. For those who are loading for a .40 S&W 1911, or an STI or Infinity hi-cap in .40, and don't want to get their chamber reamed, this is the bullet. It also, as the correct 10mm length, provides reliable feeding without the experimentation of the Enos approach to OAL.

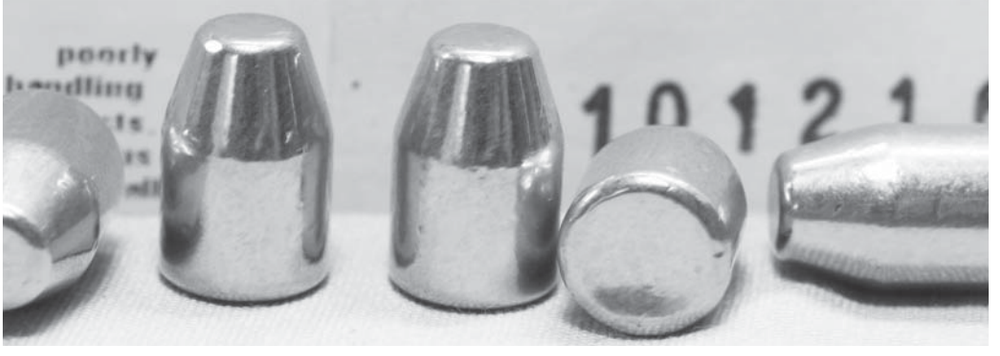
BRASS IS BRASS?

And finally, the .40 is prone to a disease that other cartridges don't see often: "Guppy-belly brass." Here, the brass is extruded into the feed ramp area, blown to a size larger than it should be by the magnum pressure of the .40 performance spec. For a lot of people, this is a problem. Me, I see it as a symptom, as in "You really ought not to be using that load in that gun." I toss bellied brass. But, brass that gets fired in loose chambers (but not over-pressure loads) may appear normal while refusing to chamber in tight (but proper) chambers. For that, you need the Redding G-RX die. This die pushes the brass straight and completely through, sizing it down to minimum dimension all the way to and over the rim. Slightly-blown brass is saved, at least for a few more loadings. Alas, they make it for the .40 only.

Now, this works only with brass, not nickeled cases, and you will have to use some sort of lube. And then clean the lube off before proceeding to your next loading step. However, if you have a problem with range-found brass not quite being sized enough, this can save your bacon.

BRASS LIFE

Here we have a problem, and again I have to name names. Glocks are hard on .40 brass. Glock chambers tend to be a bit larger than the dimensions of other pistol chambers,



Lacking a crimp groove, you have to be gentle in crimping the 180, but you gain the flexibility to load to any OAL that works in your handgun.

and brass fired in Glocks is likely to need the above treatment to work in a tightly-chambered (as an example) STI or Infinity pistol. (See above for the symptoms.) Glock does not consider reloaded ammo to be suitable ammo, and as long as the factory-new brass works as-intended, they are happy.

We, of course, are not.

So, if you have several .40 pistols in your safe and one of them is a Glock, you may well find that you have to either sort your brass and keep the streams segregated for reloading according to pistol type, or treat it all to the Redding die.

That said, properly treated, .40 brass will last as long as any other.

.40 S&W 1911 5" barrel					
Loaded to standard .40 S&W length, maximum oal of 1.135" Reminder: No lead bullets for use in Glocks!					
Bullet		Powder	Weight	Velocity	Power Factor
170 Oregon Trail SWC		AA #2	3.8	894	152
170 Oregon Trail SWC		AA #2	4.2	891*	151
170 Oregon Trail SWC		Titegroup	4.1	905	
170 Oregon Trail SWC		Bullseye	5.1	943	
170 Oregon Trail SWC		WW-231	5.5	939	
** 4" barrel, common on carry guns.*					
180 Oregon Trail FP		Titegroup	4.6	941	
180 Oregon Trail FP		WW-231	5	935	
180 Oregon Trail FP		VV-320	4.1	937	
200 North East Cast FP		AA #5	5.2	814	
200 North East Cast FP		WAP	5.1	823	
200 North East Cast FP		WAP	5.6	888	
Loaded to standard .40 S&W length, maximum oal of 1.135" Jacketed bullets-suitable for use in Glocks and all other pistols as well					
Bullet		Powder	Weight	Velocity	Power Factor
155 Hornady XTP		Titegroup	5.6	1101	
155 Hornady XTP		WW-231	5.8	1099	
155 Hornady XTP		VV-320	5.2	1074	
155 Hornady XTP		Autocomp	7.7	1206	
180 Berry's FP		Titegroup	4.6	971	
180 Berry's FP		WW-231	4.9	956	
180 Berry's FP		VV-320	4.1	942	
180 Berry's FP		Autocomp	6.1	1078	
200 Hornady XTP		Titegroup	3.8	810	
200 Hornady XTP		WW-231	4.6	851	
200 Hornady XTP		VV-340	4.7	910	
200 Hornady XTP		Autocomp	5.1	897	
Loaded to 1911-feeding length, no lead segregation needed					
Bullet	Length	Powder	Weight	Velocity	
180 Berry's FP	1.190"	Titegroup	4.2	939	
180 Berry's FP	1.190"	VV-310	3.7	787	
180 Oregon Trail FP	1.195"	VV-310	3.8	845	
200 North East FP	1.190"	WW-231	4.6	856	
200 Colorado Cast FP	1.190"	WW-231	4.6	847	

Chapter Sixteen

.41 MAGNUM

The .41, a victim of timing, is an excellent cartridge that just doesn't get the respect it deserves. It is the middle magnum, but its fate to have come last made it the step-child of the magnum world. The .357 came in 1935. The .44 came in 1955. The .41 did not come along until 1964, which seems a long time ago, now. But by the time it appeared, the world had already been divided between the .357 and the .44. And, the medium-sized revolver world had already adjusted to the .357 Magnum in the S&W K-frame, the famous M-19.

The .41 had the unfortunate distinction of being fit to a revolver that already accepted the .44, the Ruger Blackhawk and Super Blackhawk, and the S&W N-frame. As such, it was neither fish nor fowl. It wasn't as big in bore size and performance as the .44, and it wasn't as compact in frame size and ease of carry as the .357-sized guns. The only one where it had a home was the Ruger Blackhawk, and they stopped making it in anything bigger than .357 after a few years.

The initial plan was a good one: make a mid-sized magnum that could also be a good-sized police duty revolver. A good idea to start with. However, cost-cutting and corner-cutting doomed it. First, the ammo. It was initially offered (and to this day pretty much still is) in two loadings, a 210 grain jacketed softpoint, and a 210 grain lead semi wadcutter. The jhp was full power. The lead SWC was meant as a carry load, but it was both too stout, and the bullet too soft. As a result of trying to launch a 210 soft (swaged, if you can believe it) bullet at nearly 1,000 fps, it kicks too much and leaded too quickly. And, both loads were made up in cases marked ".41 Magnum." In the 1960s, there was many a police chief who would not allow "magnums" to be carried. Had it been made in .41 Magnum and .41 Special, it could well have overcome that problem.

.41 brass is .41 brass, you can't make it from anything else.

By far the most common bullet weight in .41 is 210 grains.

Coming as it did in a full-sized S&W revolver, it was a big gun to carry. Had S&W done the work in the early 1960s to produce what they did in the early 1980s, the L-frame, they could have made the adoption of pistols later much less of a certain thing. A mid-sized revolver scaled to carry a .41 Special would have been quite attractive and side-stepped the whole "magnum" PR problem.

Despite that, there are a surprisingly large

If you need extreme penetration, you can have it. Load either of these 265 grain bullets up as stout as you or the gun can take, and they will shoot clean through a moose.

Minor differences in nose shape can mean big differences in overall length, and the powder charge needed for max performance. Move up in powder in small amounts, never start at the top.

number of .41s out there. Why? Blame Dirty Harry. When the Clint Eastwood movie hit the theaters in 1971, the .44 Magnum was known but not overly popular. All of a sudden, every shooter with aspirations of grandeur had to have one. The gun shops shelves were stripped bare and S&W couldn't keep up. Rugers sold well, but "the gun" to have was one like the one Inspector Harry Callahan packed. S&W couldn't keep up, but despite that still kept making .41 Magnum revolvers. Those in the know bought a .41 at retail, instead of a .44 at waiting-list premiums. How bad did it get? My brother bought a .41 at suggested retail for $289. His football buddy had to have a .44, and paid $450 for one. (Ouch!)

It also wasn't uncommon then to see a used .44 in gun shop display cases, jokingly with a partial box of ammo with it, "six shots fired."

Two exemplars of the .41 Magnum: top an S&W M-58, bottom, a very early .41 Magnum Blackhawk.

Unlike calibers with a longer history, you won't find any chamber/bore mismatch shenanigans.

The .44 kicked, especially when fired one-handed as Harry had, and as most shooters back then did.

The .41 also suffers from a twist rate that is a bit too slow. As a result, accuracy with the heavy bullets (in a similar fashion to the .44 Magnum receiving bullets up to 315 grains) is not as good as it could be.

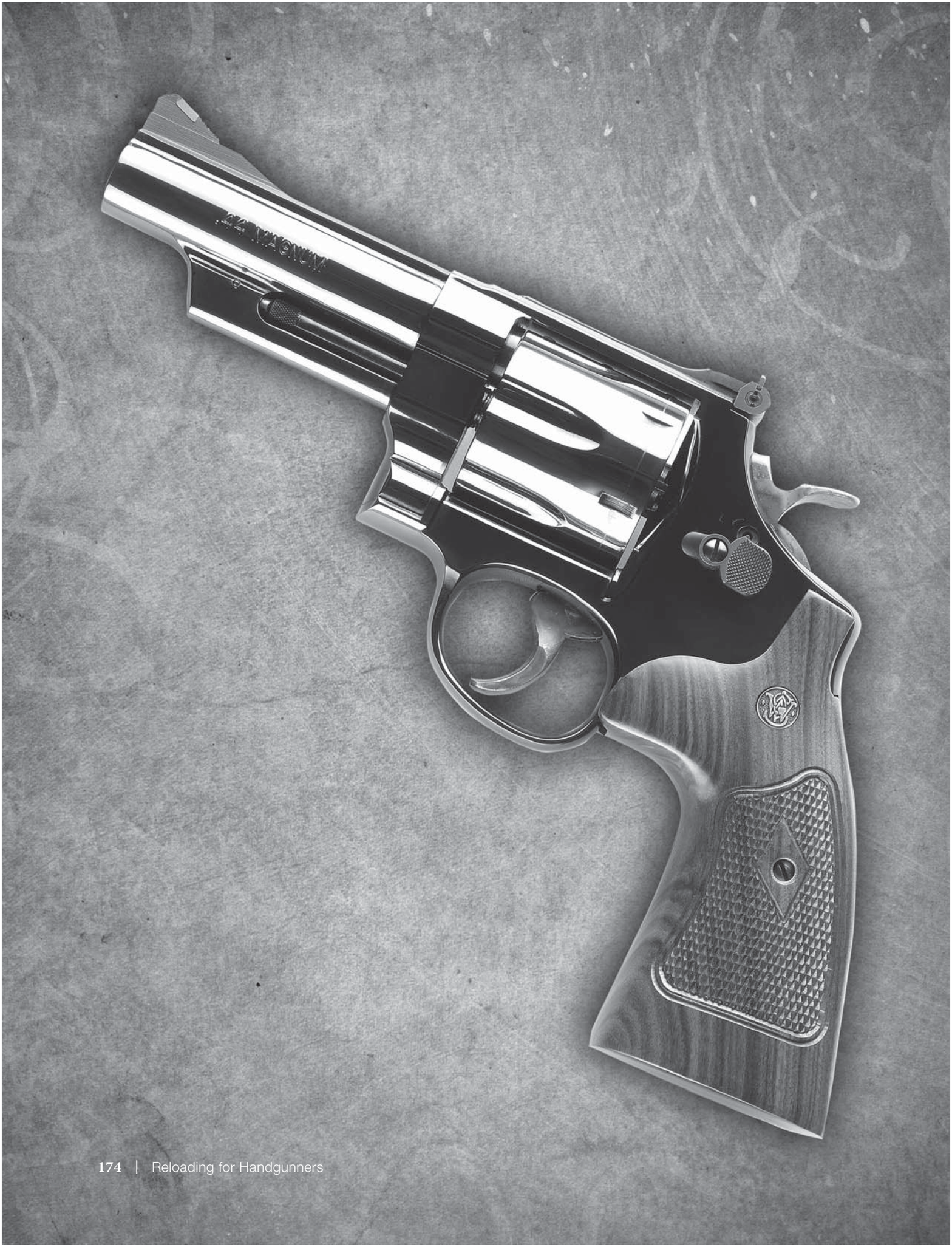
Still, the .41 is a good cartridge.

In its full-power guise, you will have the same upper-body work as you would with a .44; working the handle on your press during the sizing operation will be nearly a cardio-vascular one. If you load to the upper .45 ACP/lower .44 Magnum power levels, you will find things going a lot easier.

Bullets are readily available, if not in a vast array of shapes and weights. The standard jacketed diameter is .410 inch, the lead .411 inch. Cases use large pistol primers, and with the top-end loads and slow powders you'll find magnum primers recommended. Unlike calibers with a longer history, you won't find any chamber/bore mismatch shenanigans. As a result, there is no need to search for odd-diameter bullets to fill oversized throats. There won't be any oversized throats.

As much as I like the .41, I really have to admit that it is a niche cartridge, like the 10mm, and that while there are plenty who love it, it isn't going to gain wide acceptance anytime soon.

.41 Magnum chronograph data 4.75" Blackhawk and/or 4" S&W M-57					
Bullet	OAL	Powder	Weight	Velocity	Power Factor
Oregon Trails 210 L-SWC	1.581"	Bullseye	5.4	809	174
Oregon Trails 210 L-SWC	1.581"	WW-231	6.4	824	173
Oregon Trails 210 L-SWC	1.581"	Titegroup	4.7	857	179
Oregon Trails 210 L-SWC	1.581"	VV N-320	4.2	831	174
Berrys 210 P-TC	1.581"	Titegroup	4.7	823	172
Berrys 210 P-TC	1.581"	VV N-320	4.9	937	196
210 Hornady XTP		2400	18.4	1263	
210 Hornady XTP		VV-N110	18.6	1291	
210 Hornady XTP		HS-6	11.7	1274	
210 Hornady XTP		Longshot	10.8	1347	
Full-power hunting loads for use in Ruger revolvers. These should be worked up carefully. Beginning at this point, the recoil may be too much for many shooters, and some guns.					
Cast Performance 250 WFNGC	1.551"	H4227	15.7	1167	291
Cast Performance 250 WFNGC	1.551"	H110	16.1	1179	294
Cast Performance 250 WFNGC	1.551"	Lil'Gun	15.6	1211	302
Cast Performance 255 WFNGC	1.656"	H4227	16.9	1201	306
Cast Performance 255 WFNGC	1.656"	H110	17.1	1233	314
Cast Performance 255 WFNGC	1.656"	Lil'Gun	16.8	1234	314
Cast Performance 265 WLNGC	1.711"	H4227	16.5	1201	318
Cast Performance 265 WLNGC	1.711"	H110	17.7	1256	332
Cast Performance 265 WLNGC	1.711"	Lil'Gun	17.6	1229	325
Oregon Trails TrueShot 265 WNFP	1.706"	H4227	16.5	1195	316
Oregon Trails TrueShot 265 WNFP	1.706"	Lil'Gun	17.5	1209	320



Chapter Seventeen

.44 MAGNUM

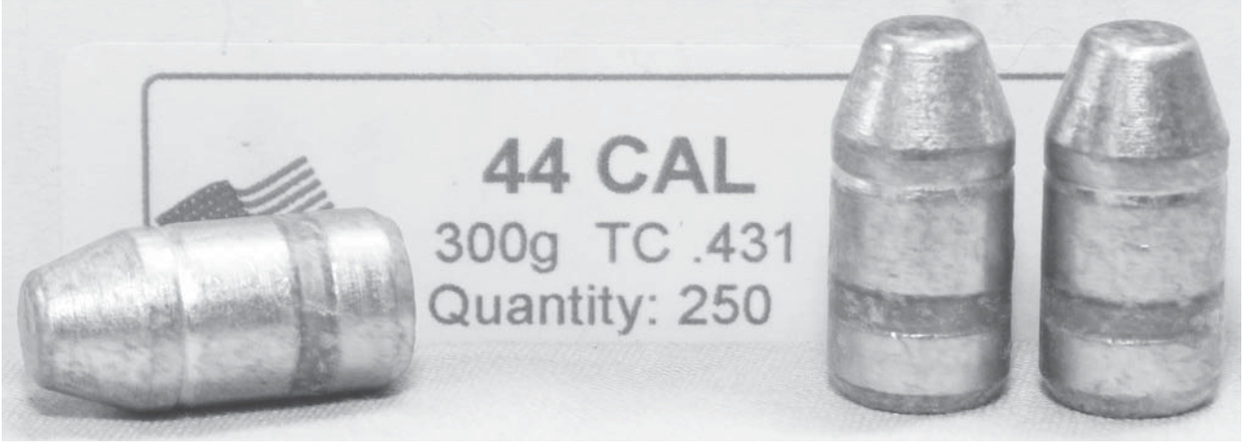
Is there anyone who doesn't know the story of how Elmer Keith experimented with the .44 Special, and by taking advantage of a few things, made it more than it was? Okay, a quick rundown: The .44 Special comes about from S&W, in their new Hand Ejector frame, at the turn of the 20th century. In the 1920s, Elmer Keith, a working cowboy and hunting guide, starts using the then-new powders to get more out of it. He does this by taking advantage of three things.

First, the strength of the Hand Ejector frame. By today's standards, they are pretty weak. But, for back then, they were overbuilt for the cartridges they were fed. So he used that extra strength the way some drivers use their anti-lock brakes to tailgate. Hey, they can stop faster, so why not use that margin, right?

Second, the new powders were more progressive. Not in the modern, political meaning of the word, but in that they lowered the peak of the burning curve of the powder and extended the bulge towards the muzzle. This allowed greater velocities while still staying under the pressure ceiling. Although, to be fair, Elmer grossly exceeded the pressure ceiling of the .44 Special with his loads.

Third, he gained a bit more case capacity by changing bullet shape. The classic Keith semi-wadcutter puts more of the bullet out in front of the case than the old lead round nose. The LRN, at 248 grains, sticks down into the case more than the Keith, at 240 grains, and with a wide bearing shoulder in front of the case. The wide bearing shoulder also acts to line up the bullet in the chamber throat, giving it a straighter start towards the forcing cone.

The normal range of bullets go from 180s to 240s.



If you want a real sledgehammer load for your .44, then these Oregon Trail 300 grain slugs will suffice.

Fast-forward to the 1950s, and Elmer has been trying to get the gun companies to adopt his cartridge. He basically runs a con; he convinces S&W to build the guns if Remington promises to make the ammo. At the same time, he gets Remington to promise to make ammo if S&W makes the guns. Faced with such enthusiastic work, they both give in. The new load, however, is more than what Elmer wanted. His original load was one that drove a 240 grain hard-cast (by the standards of the day, not hard by today's standards) semi-wadcutter at 1200 fps – a load that shoots clean through most critters you'd use it on.

Remington loaded a swaged, gas-checked bullet as much past 1200 fps as the pressure ceiling would allow. In an eight-inch S&W M-29, that could come close to 1400 fps. Yowza!

The late Bill Ruger managed to score a small paper bag of ammo and once-fired brass, before the unveiling of the S&W/Remington combo, and wrestled the .44 Magnum into his Blackhawk revolver, which, as it turned out, was just a tad too small for the job. In .44 Special, and even .41 Magnum, the Blackhawk was fine. In .357 Magnum, it was indestructible. But the .44 magnum beat it up pretty handily. So, a few years later came the Super Blackhawk, which is so sturdy it set a new, much higher, bar for the .44 magnum.

Yes, you have to load them deep. Yes, they weigh a lot. Yes, the recoil will be stout. Yes, you can load them too hot and beat up your revolver. Take care on all counts.

One that the S&W 29 and its descendants really can't stand up to.

In traditional loads, that is, those that do not stretch the 240 @ 1200 boundaries, the S&W M-29 and later versions do quite well. The latest can take it longer than you probably can; the earlier guns, not so much. (If you have a 1950s S&W in .44 Magnum, you have something getting close to collector's status. Please don't beat it up with hot loads.) And since a hard-cast 240 at 1200 fps will shoot through a moose, you probably don't need more.

If you do, there are the various Rugers – Super Blackhawk, Redhawk and Super Redhawk. These take the heavier-than-240 loads. There, you push bullets from 265 to 310 grains, at 1100 to 1200 fps, depending on just how much recoil you can stand. Me, not so much of them, which I quickly called "T-Rex" loads. When I was gunsmithing, I would sometimes have to work on and test a customer's gun that used these loads. (Usually in for a beaten-up centerpin retainer.) I found I had a tolerance for maybe two dozen shots of that stuff and I was done. If I had to do any other work on that range trip, I could only shoot a dozen rounds of the T-Rex loads, and then only at the end of my sessions. Otherwise, I could not get any other work done, being too beaten-up by recoil myself.

The .44 Magnum uses a case longer than that of the .44 Special (so it won't chamber in "lesser" guns) but otherwise with all the same dimensions. Jacketed bullets run .429 inch and cast, swaged or plated bullets generally run .430 inch. As the reloading dies have all been made since the adoption of the .44 magnum, you don't have to worry about dimensional variances. Sizers, expanders, etc. are all going to be the correct diameter, except if you plan on using T-Rex loads.

The heavier recoil of the loads calls for a heavy crimp, and to uniformly apply that crimp you'll be well-served to actually trim your brass. Now, you aren't going to have to

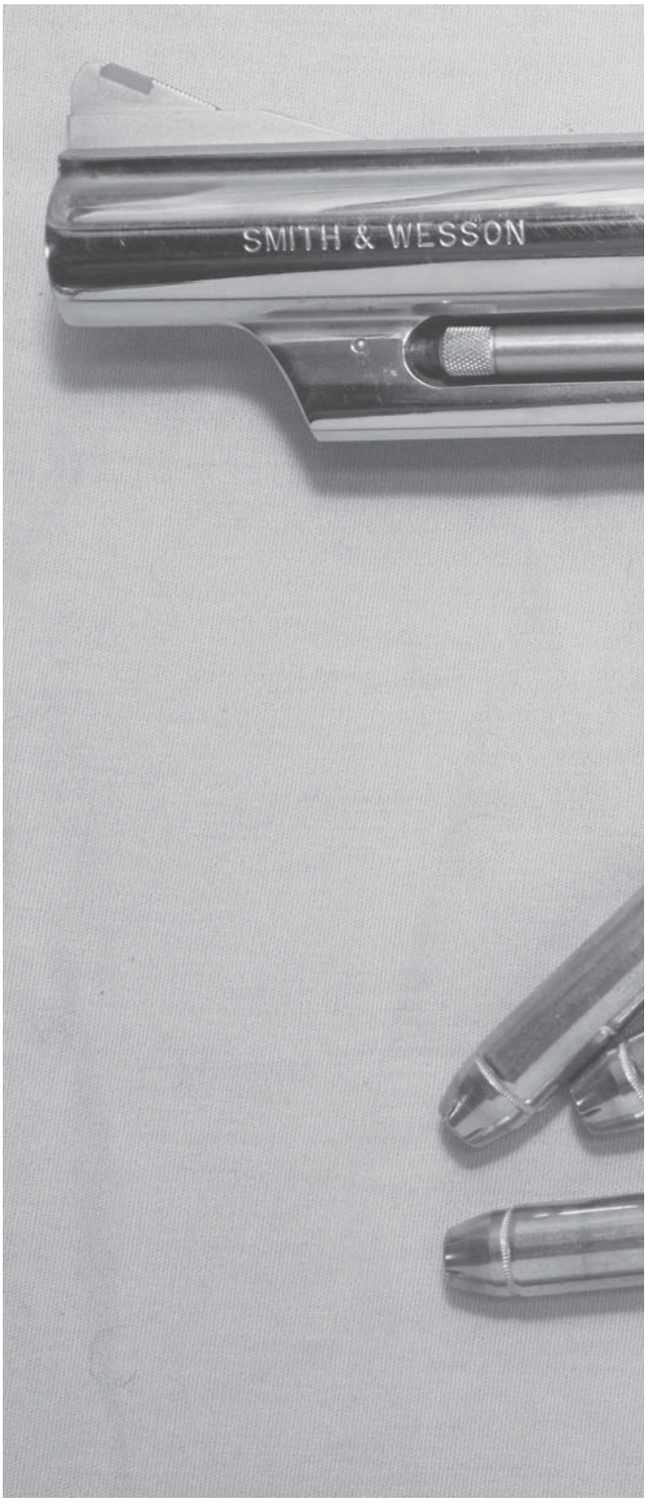
do much of it. A couple of hundred trimmed ones will serve you for a few years at the very least. You need not trim a five-gallon bucket of them. Also, you should check on your ammo in series; trim brass, size, deprime, reprime, neck expand, load and crimp. Do that to a dozen rounds.

Test-fire for velocity, and subject one round to the full recoil of the others. Measure it before and after you test-fire. If it gains in length, you need more neck tension. Polish down (or get a smaller) neck expander stem, and increase neck tension that way, rather than trying to massively increase crimp.

Of all the cartridges we cover, the .44 Magnum benefits from both a carbide or Tin sizing die and case lube. With full-power or worse yet, T-Rex loads, your cases will be difficult to resize. It would be prudent, especially with the T-Rex loads, to lube and size as a separate step, then clean the lube off and introduce your sized brass to the reloading process in another operation. Rather than expect the powder measure to drop a consistent (and large) powder charge each time you wrestle with and jump on the handle to size, do the sizing first and separately.

If you do not plan to load the monster loads, and simply load to moderate or upper Magnum loads (you'd be surprised at what a 240 at "only" 1050 fps can do), then your reloading will be like any other caliber – easy.

And if you want to use your .44 Magnum for defense, well, life is easy. For carry and defense, you'll want to use the high-performance .44 Special ammunition. There, a 180 at right around 1,000 fps is a mild-seeming load in an M-29. To match it in your practice ammo, you simply use top-end .44 Special loading data,



“The most powerful handgun in the world.” And it stayed that way for a while. There are more-robust cartridges now, but the .44 Magnum is the biggest most can shoot comfortably.

For those loading in the Ruger Super Blackhawks, the heaviest bullets can be pushed at impressive velocities. These are hunting and practice-for-hunting loadings.

Left to right: Cast Performance 275 grain, Berry's 280, and Oregon Trail True Cast 310.

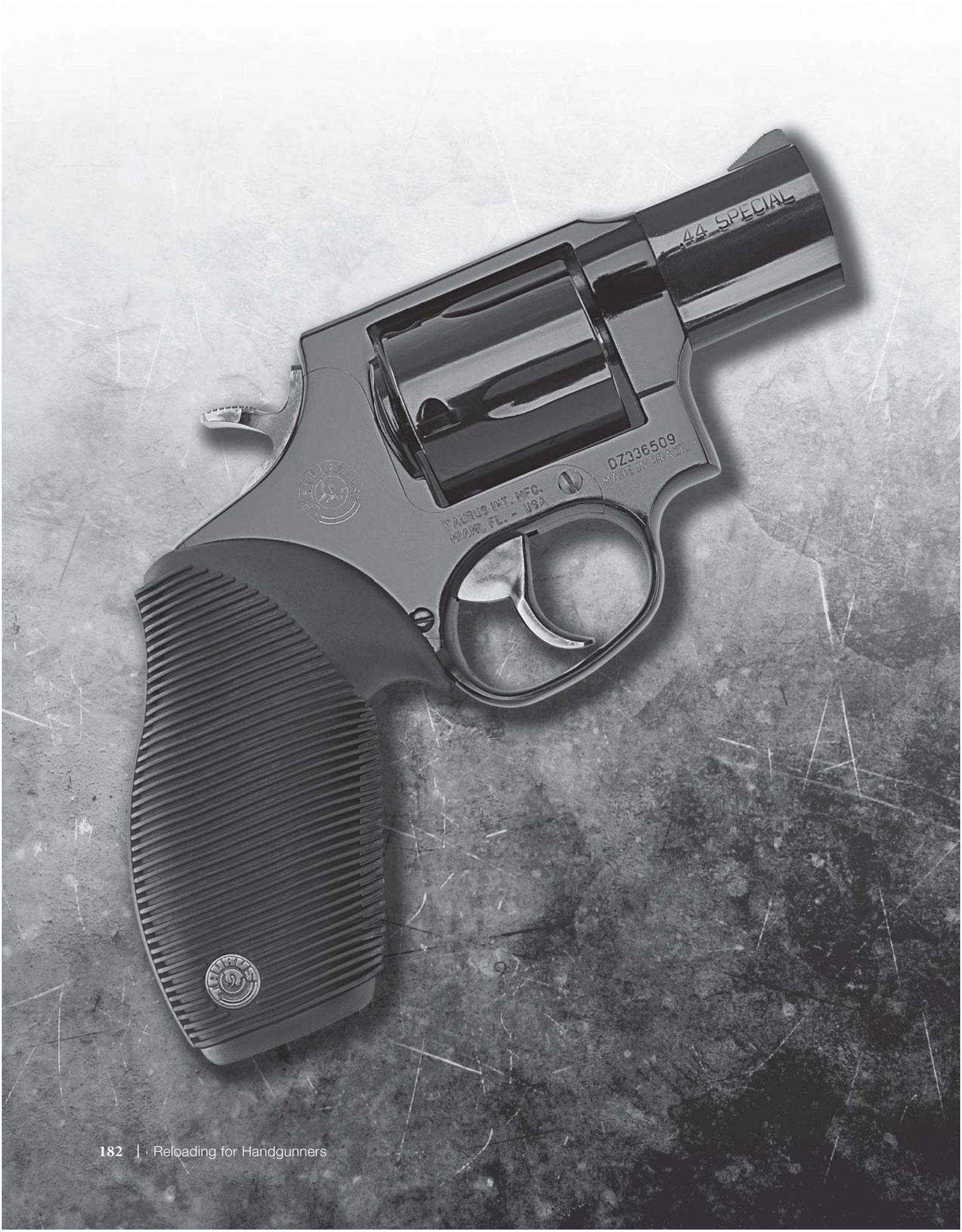
and you're good to go. The pressures involved will hardly work the tough Magnum brass at all.

When we were using revolvers on bowling pins at the Second Chance match, a .44 was a versatile tool. If all you had were 240 grain hard-cast SWCs, you simply loaded them to the same velocity any .45 ACP user would, 825 fps. If you favored the 180 JHPs, then you only had to make them go 1,100 fps, and you were in business. Either set was a piece of cake for the Magnum.

No, the .44 Magnum isn't the world's most powerful handgun any more. It isn't even close, either in how many stand between it and first place, or in how much horsepower it and the leader generates. But, it generates a more-than-useful amount for many of the tasks we ask of a handgun. If you don't have a .44 Magnum, you might want to get one. And if you have one, you can do a whole lot of experimenting with one, as it allows for perhaps the widest range of performance of any handgun cartridge we have.

Velocities from S&W M-29, 4":				
Bullet Weight	Primer	Powder	Weight	Velocity
180 gr Oregon Trail LTC	Rem LP	Titegroup	5	926
180 Hornady XTP	Rem LP	HP-38	6.3	948
180 Hornady XTP	Rem LP	N-320	7.5	959
180 Hornady XTP	Rem LP	N-320*	10.2	1299
180 Oregon Trail LTC	Rem LP	Bullseye	6.7	970
180 Oregon Trail LTC	Rem LP	HP-38	6.1	927
220 Berry's FP	Rem LP	Titegroup	8.1	1150
220 Berry's FP	Rem LP	WW-231	8.5	1171
220 Berry's FP	Rem LP	Autocomp	10.1	1147
240 Berry's FP	Rem LP	Titegroup	5.1	924
240 Berry's FP	Rem LP	HP-38	5.5	879
240 Berry's FP	Rem LP	HS-6	8.5	949
240 Oregon Trail LSWC	Rem LP	2400	18.5	1275
240 Oregon Trail LSWC	Rem LP	Titegroup	5.5	853
240 Oregon Trail LSWC	Rem LP	Titegroup	9.5	1203
240 Oregon Trail LSWC	Rem LP	N-350*	12.6	1284
240 Hornady JSP	Rem LP	WW-231	9.5	1056
240 Hornady JSP	Rem LP	HP-38	9.5	1147
240 Oregon Trail LSWC	Rem LP	AA#5	10	832
240 Oregon Trail LSWC	Rem LP	Clays	5.2	873
Loads from 7.5" Ruger Super Blackhawk. Note: all these loads are "monster" loads, too stout for most, if not all, S&W revolvers. Start at least 10% below these loads, and work up, watching for signs of excess pressure.				
240 Oregon Trail LSWC	Rem LP	N-350	12.6	1289
240 Hornady JSP	Rem LP	N-105	16.1	1411
280 Berry	Rem LP	H-4227	20.6	1292
300 Hornady XTP	Rem LP	N-110	17.7	1269
310 Oregon Trail Trueshot	Rem LP	N-110	17.7	1271
310 Oregon Trail Trueshot	Rem LP	H-110	21	1311
310 Oregon Trail Trueshot	Rem LP	Lil'Gun	16.2	1211

** These loads have proven safe in my S&W 29, but some revolvers I've used them in have shown slight pressure signs. Work up to them carefully.*



Chapter Eighteen

.44 SPECIAL

The .44 Special came about in 1907. S&W had a new revolver design, the New Century, and the big new frame (they had unveiled the same design, but as a smaller-sized frame, back in 1897 as the Hand Ejector) came with a new cartridge, the .44 S&W Special. It was intended to replace the .44 Russian, which had a stellar reputation back then for accuracy. I've read in a few articles that the new, longer Special case was designed to accommodate the bulky smokeless powders of the day. All I can say is, I'm scratching my head to figure that one out. Smokeless powder was far less bulky (and still is) than black powder. Yes, there were some "bulk" smokeless powders en vogue at the time, mostly for reloaders who weren't willing to invest in a scale to weight charges of smokeless powders, and who still wanted to load powder by volume, as they had with black powder. But S&W didn't make this new cartridge for them. S&W didn't need the space for smokeless.

The answer, as far as I can see, was marketing (the new frame could accept bigger cartridges), and to go along with the .45 Colt, .44-40 and .38-40, S&W made a longer case for the Special. Just looking at it, you had to figure it was better than the Russian, right? Ballistically, it was pretty much the same as the Russian, however it was just as accurate, so everyone was happy. Back then, you had your usual choice of bullets – anything you wanted, so long as it was lead and round-nosed. When you're limited that way, there was no such thing as getting too much. So, the .44 Special, a 246 grain LRN, at 750 fps, was a very respectable round.

More so than many other calibers, you have to measure and match bullet diameter to the individual handgun.

It is vogue to push the Special past its design limits, and even tread on the lower ends of Magnum territory. "Elmer Keith did it!" is the usual response to "Why?" The SAAMI spec, the peak pressure, is 15,500 psi, which is a far cry from the 36,000 of the .44 Magnum. Me, I figure if you want the magnum you should get and load the magnum, not make the Special more than it is. However, it is entirely possible to boot a 240 grain lead semi-wadcutter up to 1,000 fps while still remaining at or under the max pressure allowed.

The .44 Special is greatly loved by its admirers, and viewed as another old cartridge by pretty much everyone else. It is perhaps

the exemplar of the "loafing big bore" school of cartridge design, use and loading.

A hard-cast 240 going 1,000 fps will shoot through any whitetail that walks (or probably has ever walked) the North American continent. It might be a bit light for a wild boar, if you get past, say, 200 pounds, but in such an instance, all I can do is repeat what I mentioned above: if you want a magnum, get one.

The dimensions involved have all been pretty consistent in the century since its debut. The bullets are still .429 inch for jacketed, and .430 inch for cast, and you will want a good crimp and neck tension on your loads. One thing you will find, if you stay within the pressure limits of the Special, is that resizing is not going to be difficult. Unlike the Magnum, you won't have to stand on the press handle to get a case to resize. If you use carbide dies (and you should every time you have that option) your clean cases will slide right in and out, smooth and easy.

Bullet selection is pretty easy. If you are going to be shooting Cowboy Action, you'll probably want to be using a cast 180 or 200 grain bullet. For practice for hunting, a 240 cast. If your practice ammo is for the defensive load you'll be carrying, then either a 180 jhp, or a 240 jhp, picked to match what you carry.

As a standard, and for most die makers, the same die as that for the .44 Magnum, your dimensions will not be a source of trouble. You will in all likelihood not find a neck expander that is the wrong size, and sizing dies will bring cases back down to the proper dimension. It is a very easy and almost sedate cartridge to load for.

That doesn't mean it can't bite you. The capacious case makes soft loads problematic. A pinch of Bullseye powder, in that big case, to

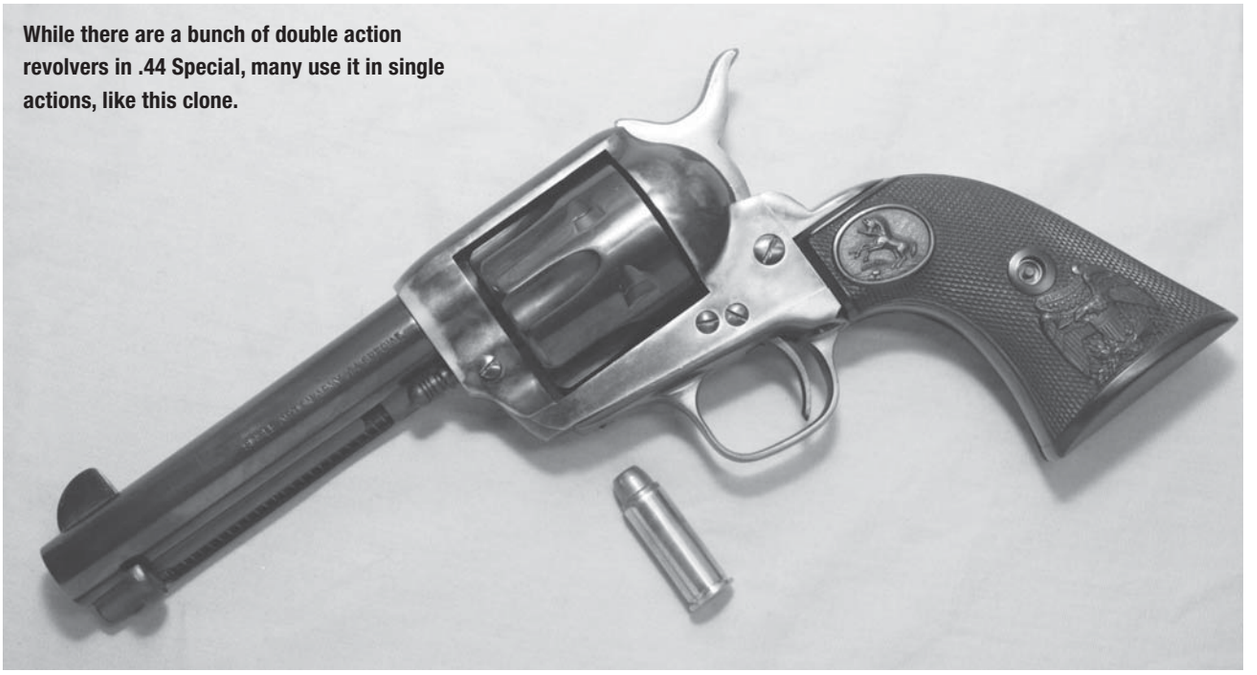
From 180 to 240 grains, the .44 Special offers a lot of versatility. Just don't try to make it a magnum.

This slug has been driven through a clean bore to determine groove diameter.

sedately boot a bullet out of the bore, may not have consistent ignition. If you are loading for, say, Cowboy Action shooting, and you want to shot a 180 at a mere 625 fps, you may find that Trail Boss is the powder for you. It is bulky beyond belief (a one-pound powder jug, which usually has extra space inside, will hold a mere nine ounces of Trail Boss) and fills the case when loaded to produce "softy" loads.

Due to the big case, many reloaders are willing to accept a slightly less-efficient loading (efficient as determined by the amount of powder needed to achieve a certain velocity) in the interests of bulk. Something that clearly creates a double-charge, either when checked by eye or by an automatic powder-checker die, is desired. Hence the continued use by Special shooters of powders like Unique. Sure, it is old and a bit dirty, but it bulks up enough that your powder-check die will go ding-ding-ding at a double charge.

Crimp on the Special is rather forgiving, as long as you are not trying to recreate Elmer's load. You won't need to trim brass unless you scavenge a bucket of random brass from the gun club when you first start your .44 Special loading career. Then, once you



While there are a bunch of double action revolvers in .44 Special, many use it in single actions, like this clone.

sort out the .44 Specials from the magnums (.44 and .41) and the .45 Colt, plus whatever else you vacuumed up, you can do a one-time only mass trimming. Set your trimmer to the "trim to" length and give them all a whack, whether they need it or not. You'll be set for as long as all that brass lasts you.

.44 Special, 4" S&W M-29			
Bullet	Powder	Weight	Velocity
180 Oregon Trail FP	Titegroup	5.4	1006
180 Oregon Trail FP	Trail Boss	6.5	979
180 Oregon Trail FP	WW-231	5.6	949
180 Oregon Trail FP	VV-320	6.2	871
200 Oregon Trail FP	Titegroup	5.4	938
200 Oregon Trail FP	Trail Boss	6.3	867
200 Oregon Trail FP	WW-231	5.6	899
200 Oregon Trail FP	VV-320	6.2	789
220 Berry's FP	Titegroup	5	859
220 Berry's FP	Trail Boss	5.2	791
220 Berry's FP	WW-231	5.2	870
220 Berry's FP	VV-320	5.8	801
240 Oregon Trail SWC	Titegroup	4.8	869
240 Oregon Trail SWC	Trail Boss	5.2	778
240 Oregon Trail SWC	WW-231	5.2	865
240 Oregon Trail SWC	VV-320	6.3	829
240 Berry's FP	Titegroup	4.8	852
240 Berry's FP	Trail Boss	5.2	761
240 Berry's FP	WW-231	5.2	843
240 Berry's FP	VV-320	6.3	811

Chapter Nineteen

.45 ACP

Introduced in 1911 along with the pistol it was chambered for, the .45 ACP was developed over the course of nearly a decade. Since then it has had a century of fine-tuning. It never had the problems of tolerance wandering that other cartridges suffered from, as the bullet diameter was always the same. As a lo-pressure cartridge with a big case and a big bullet, the .45 is very forgiving of new reloaders. So much so that the transition to a more cranky cartridge may not be an always smooth one.

The operating pressure of the .45 ACP is right at 21,000 psi. The +P version is 23K, and that can also lead to trouble. Some people will look at the .45 and then look at something like the 9mm and wonder at the disparity. (The 9mm runs at 34K psi.) They naturally assume that there is some conspiracy of the gun manufacturers to "cheat" them of the performance the .45 could "actually deliver."

There is no conspiracy. There is no such thing as a free lunch. Yes, you can increase the pressure your .45 is loaded to, but you will pay for it. You'll pay in extra recoil, shorter brass life, beaten-up guns and the occasional blown case. A blown case can be as uneventful as cracked grips and a disassembled magazine. And it can lead to splinters in your hand, pieces of metal vigorously flying about the range, and your friends coming up with nicknames for you, such as "Lefty," "Shrapnel" and "I don't want to be next to him."

As with so many cartridges for which this is true, if you want more performance, switch to the cartridge that delivers it.

The nominal case length of the .45 ACP is .898 inch You could slap your micrometer

or dial calipers on a bucket full of .45 ACP brass and never find one that long. In fact, you'd be hard-pressed to find many much over .890 inch long. I have no idea why the Army, Browning, Colt, or whoever, decided on .898 inch. It isn't a fractional size, a metric size or an easily-remembered size. It just is. The only thing I can think of is that late in the process they were locked in by decisions they had made before; they were stuck with the magazine size they had. They had selected a .45 caliber, 230 grain jacketer round-nosed

When it came to shooting bowling pins, the .45 was chosen by a great many shooters.

The .45 works in both pistols and revolvers. Competition, defense, even hunting, you have lots of choices.

bullet. In order to have the case not so long that it passed the beginning of the bullet nose ogive, they settled on .898 inch. But that's just a guess. Trimming to length is an exercise that high-volume .45 ACP reloaders are totally unfamiliar with.

However, there is one thing they have all had to become familiar with of late, and that is primers. The original, and for the longest time, standard, primer size was Large Pistol. No need for magnums here. However, due to some extreme situations where those involved were shockingly unsanitary about their working conditions, which has lead to near pants-wetting hysteria about lead exposure, manufacturers were forced to make a change. As a result, the ammo makers have sought out non-lead primer formulas. The result was the original primer and flash hole dimensions were not well-suited to the new formulas. For a while, some solved the problem by using a much larger flash hole. (The new primer formulas had a higher "brisance" or ignition power, and could drive primers out of the primer pockets.)

The solution, as a manufacturing approach, was to change to Small Pistol primers. Gack! Scream! Panic! You now must sort your brass and visually confirm that all your brass is one or the other. Both will work, but you can't mix them in the loading process.

LENGTH

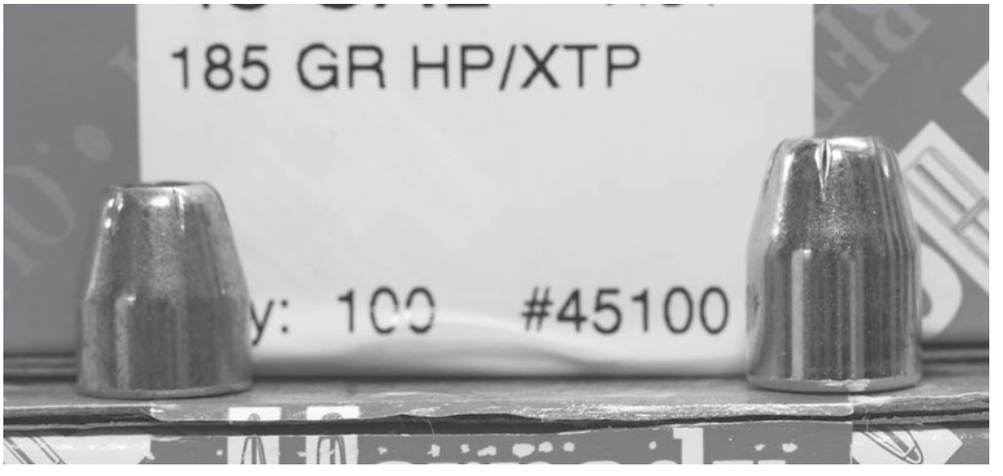
Overall length of the round depends on the bullet being used. The 1911 platform prefers long cartridges, the longer they are the better they feed. I have loaded 230 jacketed round nose out to 1.275 inches and had it feed 100 percent. One trick in establishing the correct OAL for a bullet comes to me from Brian Enos. If you find your pistol is picky in feeding, load five dummy rounds (no powder or primer) to your established OAL, and five more slightly longer. Hand-cycle them through your pistol with the recoil spring removed. If there is some hard spot or binding in the feed, you'll feel it. Try the new length. If it feels better, try some more (bullets are cheap, and you can always use an inertia puller to salvage them). If it feels worse, load some shorter and try again. Generally, though, the lengths listed in the loading data are the most-often reliable ones.

BULLET CHOICES

Bullets are not limited by your imagination, but by the magazine envelope and case pressure limits. The lightest bullet in common use for the .45 is exemplified by the Oregon Trail 155 lead semi-wadcutter. With its short bearing surface and narrow nose, it looks odd and can be tough to load accurately. Bullet seating stems are designed to seat one of two bullets, round nose and semi-wadcutters of 200 grains. The narrow nose of the 155 fits either seater like socks on a rooster. What I did to seat bullets straight was solder an extension onto a seater and then bored it out so the lip of the seater pushed against the shoulder of the 155. Then 155s seated straight without problem. The seating problem must not be much of one, for when I last talked to the folks at Oregon Trail, they had just shipped a hundred thousand of their 155s to a major West Coast police department for loading into practice ammo. Twenty years ago many of us experimented with the 155s to make Major in .45 comp guns. As a "poor man's

From 155 grains up to 230, the .45 ACP works its magic. And some have even stretched those boundaries. It isn't a magnum, but it certainly gets many a job done.

If you want accuracy, you would be hard-pressed to do better than Hornady XTP bullets.



Super" they were a stop-gap to the expense of building another gun. Now, instead of the 1150 fps for IPSC, the 155s are better used at 850-900 fps for steel plates.

What most shooters will be shooting in cast bullets are either the 185 and 200 grain semi-wadcutters or the 230 round nose. The 185 and 200 come from the design of the H&G #68, and the 200 is perhaps the most accurate bullet you can load into a .45 ACP case. I have fired groups from my Caspian Race Ready single stack out of the Ransom rest using Oregon Trail 200s that measured less than half an inch at 25 yards. The 230 round nose is not the most accurate, and according to Bill Wilson not as reliable as the 200s, but it is the traditional weight and shape. And very popular. While the lead round nose (or jacketed, either) will not deliver the tack-driving groups a 200 can, they still can be coaxed into groups two inches or less at 25 yards, which is plenty good enough for all but the most exacting work.

In jacketed, the lightest you'll see are 165s, but you can't load them. They are made solely for Cor-bon and used to load their ammo, so

as a result we have to "settle" for 185 jacketed hollow points on the light end. Jacketed bullets also come in 200 and 230 grains, for all the standard applications that you'll need. The most accurate jacketed bullets you can get for the .45 ACP are Hornady XTP. For many applications the gilt-edged level of accuracy they offer are not needed, but when they are, they are your best choice. A new Hornady bullet is the HAP, the Handgun Action Pistol. It is an XTP bullet without the hollowpoint cuts and scalloping, as target bullets need not expand. For accuracy with less cost, HAP it is.

CRIMPING

The suggested taper crimp (you don't roll crimp the .45 ACP) is two or three thousandths under the loaded case diameter. After loading several hundred thousand .45 cases and talking to high-volume IPSC, steel and pin shooters who have shot more than I have, forget that and remember this: .468 inch. You may have to ease up on the crimp if you are using soft cast bullets or hard-jacket hollowpoints, but always start at .468 inch for all your loading and R&D.

To make your case belling easier, polish any toolmarks off the belling stem or powder drop tube. If your belling stem is made of a hard substance, like tungsten carbide, it had better be mirror-bright right out of the box. The hard steel powder drops tubes of the Dillon powder measure are helped by a polishing job. Do not over-polish and remove metal, as you may reduce the diameter of the belling stem under the desired .448 inch, or make it oval. The .448-inch diameter creates a tight but not excessive fit of bullet to case. Larger, and you can't get enough crimp to keep bullets from setting back while feeding. A smaller diameter works brass excessively and can deform soft bullets. Oval the belling stem and your loads will not be as accurate as they could otherwise be.

The ideal crimp diameter allows just enough of the case mouth to be pressed into the bullet to shield the edge of the case from contact with the feed ramp during feeding, but not so much as to cut into the bullet and cut through the plating or strip lube off of a cast bullet.

PRIMER SELECTION

It is possible that selecting primers can influence loads at the extreme margins of accuracy or power. However, you have to be at those extremes for primer selection to have any effect. If (for example) primer "A" shrinks groups by half an inch at 25 yards over brand "B" you won't notice unless your pistol is already shooting groups near the one inch mark. And unless your loads are already at the top end of +P pressures, you aren't going to notice a difference of 1,000 psi from one primer to another. Use what works in your press.

The narrow nose of the 155 fits either seater like socks on a rooster.

PRESSURE

The subject of pressure always brings favorite theories out of the closet, regardless of caliber. But the .45, starting at such a low pressure, is the subject of a lot more. One is that as long as your brass isn't swelling into the feed ramp your pressures are under control. (Wrong.) The other is that primer signs can tell you when you're nearing the pressure ceiling. (Wrong again.) The .45 ACP pressure ceiling is 21,000 psi, and the .45ACP+P is at 23,000. Brass doesn't begin to swell into the ramp until well over the +P level (by some measures, double the +P level), and primers are notoriously ineffective in determining pressures. In rifles they can give some hints, but a modest rifle round operates in the low 40,000 psi range, well past the limits of the .45 ACP. If you want more power than what a .45ACP+P load delivers, you should start with a different cartridge.

SPECIAL BULLETS

You can do pretty much everything you need to do with a 1911 with two bullets, a 230 round nose, lead, jacketed or plated, and a 200 grain semi-wadcutter. The SWC should be of the H&G #68 style; that is, with a long nose. The "68" design was quite clever back when it was conceived. Essentially, the nose radius of the semi-wad coincides in space with the corresponding radius of a 230 RN, and it is the correct location where they both bear on the feed ramp.

For the 230 RN, you load to the same length as any factory 230 ammo that works properly in your pistol. You will find small variations in OAL, due to slight differences in the radii of the bullet and the seating stem and where they contact each other. As long as the bullet does not jam into the rifling (if it does, it is loaded too long) and it works 100 percent, "correct" length is a pretty flexible thing.

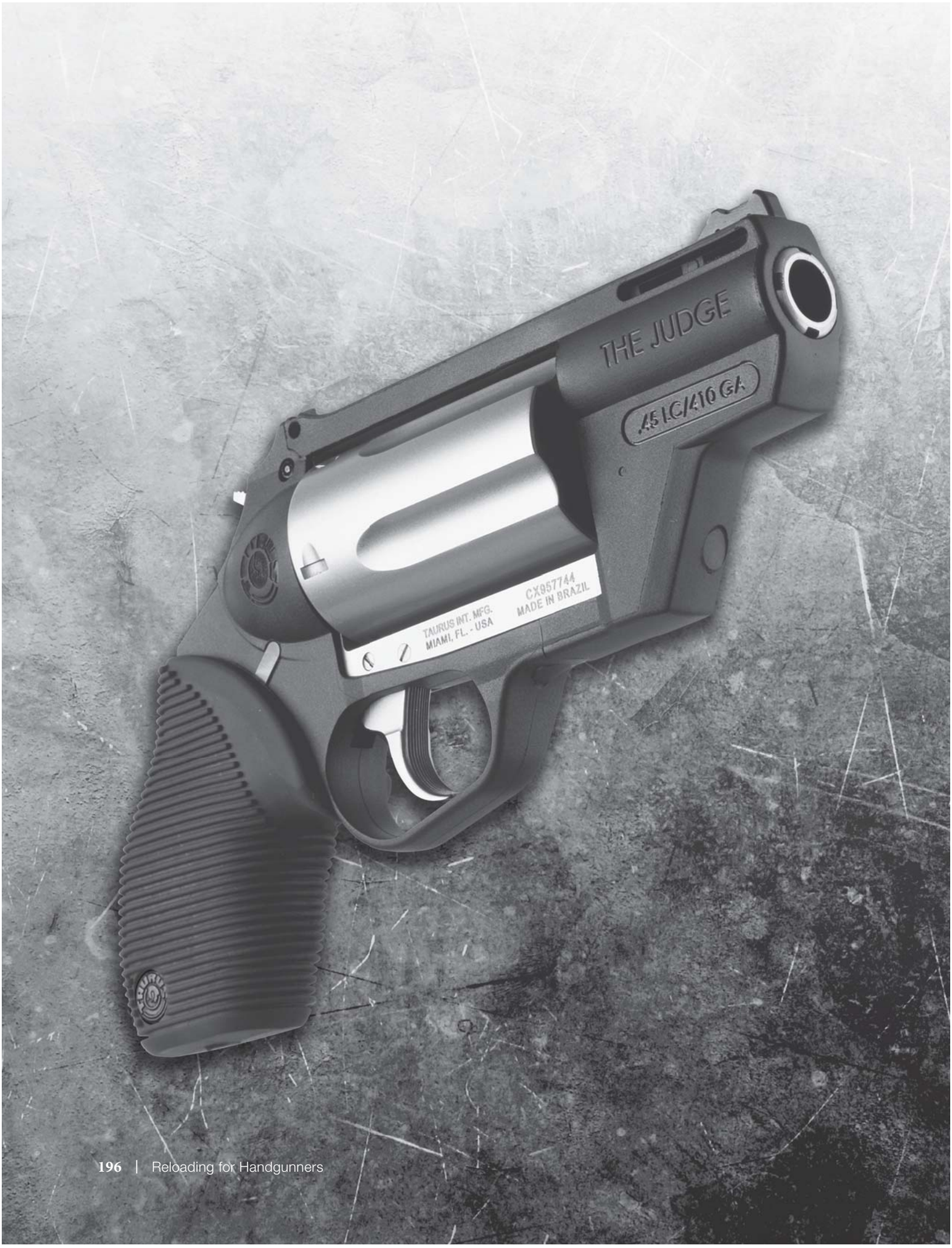
The 200 grain bullet has a similar OAL variance, but here the important part is the distance the shoulder of the bullet protrudes from the case mouth. You want it to stick out just enough to shield the edge of the case mouth from contact with the feed ramp and chamber walls, but not so much it wedges against the end of the chamber on closing. Again, there will be small variances in what you or your buddies produce, and as long as they fit, function 100 percent, and the loaded round does not wedge in the chamber, you're doing fine by your handgun. There are also 185 grain "68s", and they will simply fit into your cases with the exact same seating stem setting as your 200s. (Assuming you're using the same brand of both 200 and 185s.)

A special case is the Berry's Bullets 185 RN. Here, the 230 profile is given a mini bullet-like hollow base, to reduce weight but still give the 230 RN bullet shape for reliable feeding. The 185 is lighter, but the hollow base provides a slightly larger combustion chamber and you have to use loading data specific to this bullet to ensure correct velocities. Why use it? For reduced recoil, while feeding pistols that may not play well with SWC or JHP bullets.

To simulate defensive ammo for practice, you'd load either the same bullets as your carry ammo (by specific brand and weight) to the exact same OAL as the factory ammo. If possible, as with Hornady and its XTP

bullet, you can use an equivalent, in this case the HAP. To get the proper practice and test of reliability, your defensive practice ammo must be loaded to the same OAL and crimp diameter as the factory ammo you carry. Your practice ammo need not exactly duplicate the velocity of factory, but the closer you come, the better.

.45 ACP, Springfield 1911A1 Loaded						
Bullet	Primer	Powder	O.A.L.	Weight	Velocity	Power Factor
Oregon Trail 155 L-SWC	Fed LP	WW-231	1.250”	5.7	874	135
Oregon Trail 155 L-SWC	Fed LP	N-310	1.250”	5.6	910	141
Oregon Trail 155 L-SWC	Fed LP	N-320	1.250”	6.1	990	153
Montana Gold 185 JHP/P	Rem LP	Titegroup	1.235”	5.9	948	175
Oregon Trail 185 L-SWC	Fed LP	WW-231	1.250”	5.7	789	145
Oregon Trail 185 L-SWC	Fed LP	Bullseye	1.250”	5.6	893	165
Oregon Trail 185 L-SWC	Rem LP	N-320	1.250”	5.3	905	167
Hornady 185 XTP	Rem LP	N-340	1.225”	6.8	980	181
Hornady 185 XTP	Rem LP	HP-38	1.225”	5.8	896	166
Hornady 185 XTP	Rem LP	Universal	1.225”	6.9	977	180
Hornady 185 XTP	Rem LP	HS-6	1.225”	9.7	1011	187
Berry’s 185 HBRN	Fed LP	Titegroup	1.260”	4.4	801	148
Berry’s 185 HBRN	Fed LP	Titegroup	1.260”	5.2	931	172
Berry’s 185 HBRN	Fed LP	WW-231	1.260”	5.4	954	176
Berry’s 185 HBRN	Fed LP	WSF	1.260”	6.4	859	160
Oregon Trail 200 L-SWC	Rem LP	WW-231	1.250”	6.3	985	197
Speer 200 JHP	Rem LP	WW-231	1.165”	6.3	945	189
Oregon Trail 200 L-SWC	Rem LP	N-310	1.245”	4.5	869	173
Hornady 200 XTP	Fed LP	N-320	1.225”	4.7	890	178
Hornady 200 XTP	Fed LP	N-340	1.225”	6.8	989	198
Oregon Trail 200 L-SWC	W-W LP	WW-231	1.250”	5.8	895	179
Oregon Trail 200 L-SWC	Fed LP	Titegroup	1.250”	5.1	855	171
Hornady 200 XTP	Fed LP	HS-6	1.225”	8.8	927	185
Berry’s 200 SWC	Fed LP	Titegroup	1.250”	5.1	902	180
Berry’s 200 SWC	Fed LP	WW-231	1.250”	5.4	897	179
Oregon Trail 225 L-FP	W-W LP	WW-231	1.205”	5.8	840	193
Oregon Trail 225 L-FP	W-W LP	Titegroup	1.205”	4.5	810	182
Oregon Trail 225 L-FP	W-W LP	HP-38	1.205”	5.4	860	193
Oregon Trail 225 L-FP	W-W LP	N-340	1.205”	6.3	910	209
Oregon Trail 230 L-RN	W-W LP	WW-231	1.260”	5.1	785	180
Oregon Trail 230 L-RN	W-W LP	Bullseye	1.260”	4.2	716	164
Rainier 230 TMJ/RN	Rem LP	Titegroup	1.275”	4.7	747	172
Sierra 230 JHP/	Rem LP	Titegroup	1.230”	4.7	781	179
Hornady 230 XTP	Rem LP	Titegroup	1.230”	4.7	789	181
Hornady 230 XTP	Rem LP	N-320	1.230”	4.8	782	179
Oregon Trail 230 L-RN	W-W LP	Universal	1.260”	5.9	847	195
Berry’s 230 RN	Rem LP	Titegroup	1.260”	4.7	771	177
Berry’s 230 RN	Rem LP	WW-231	1.260”	4.9	765	176
Oregon Trail 255 L-SWC	W-W LP	WW-231	1.200”	5.4	884	225
Oregon Trail 255 L-SWC	W-W LP	Universal	1.200”	5.7	854	217



Chapter Twenty

.45 COLT

You will get grief from some quarters if you use the term ".45 Long Colt" because there are those who just can't get over the fact of two US Army .45 revolver cartridges in the late 19th century. (And a couple of others in the first few years of the 20th. People think things are confusing now, it was bad a century ago.) The .45 Colt came about with the Colt "Peacemaker," the Single Action Army, and that caused problems for decades. You see, the chamber and throat (the section of the cylinder between the chamber and the barrel) and the bore itself wandered. As in, Colt really didn't seem to care too much about keeping things nailed down. Back in the early days, soft lead bullets and black powder produced good bullet obduration even with large cylinder throats. The ideal was .454 inch, but you can find older revolvers chambered in .45 Colt with throats as big as .458 inch, which causes real problems today.

The later .45 ACP uses lead bullets of .452 inch and the latest generations of .45 Colt revolvers typically use this as the standard.

So, you could have a shelf full of .45 Colt revolvers and not have any of them agree on the proper sizes of throats and bores, and that can cause problems. The typical setup is to use hard-cast .45 ACP bullets ("Hey, they're cheap, and I already have them") in powder-puff loads for cowboy shooting/plinking. In a large-diameter gun, severe leading will be the quick results. "Leading? But the bullets are super-hard!" That's not the solution, it's the cause. The gases blow by the bullet (a .452-inch, passing down a .456- to .458-inch throat), gas-cut the bullet and blow off

Single or double action revolvers, the .45 Colt has been at work for 135 years.

the lube. By the time it hits the forcing cone it is un-lubed to a great degree, the sides are gas-scored and hot and then it hits the rifling, making the task worse.

Oh, the mess. Soon after, it will get sold, un-cleaned, with bitter remarks about poor accuracy and quick leading. If you have a revolver with large throats and/or bore, you have to use softer bullets, and they have to start out at least as big as the chamber throats. But even then the solution is fraught with problems. I've read (not seen, thank goodness) of revolvers with such large-diameter throats that you can't load bullets big enough. If you try, the loaded round is too fat to fit in the chamber.

Now, if you have a newer revolver, an S&W for sure, most of the Italian SAA clones, and even some of the current Colts, if you have one with .452-inch throats and bore, you'll probably have to make an accommodation the other way. You need to check your neck expander. If you're using a neck expander, or a powder drop that expands and bells the case, it has to be for a .452-inch bullet, not a .454-inch, or you'll have problems with the last round of a cylinder "pulling" on recoil. Expanding cases to .454 inch and then seating a .452-inch bullet leads to poor or non-existent neck tension.

If you're going to insist on having a bunch of .45 Colt revolvers and they have varying diameters, you may have to invest in a revolver-specific die setup for each. Example: one for the .452-inch revolver, one for the .454/6-inch revolver, and one for the first-generation SAA Colt with a .454-inch bore and a throat max of .4575 inch. A hassle, yes, but if you want the best performance from each, that's a likely scenario.

PRESSURE

The .45 Colt hearkens from the black-powder era. As such, it is limited by SAAMI to a pretty low operating pressure, 14,000 psi. Let that not discourage you, however. You see, even at a "mere" 14K psi, the old beast hurls full-weight bullets. In fact, the performance of the .45 Colt with Vihtavouri powders is so potentially impressive that when I was still shooting bowling pins I experimented with the combo. A 265 grain hard-cast bullet of semi-wadcutter shape (with a honkin' bit meplat) at over 900 fps brooms pins off the table right now. Where a Power Factor of 195 was considered a decent minimum, the .45 Colt could deliver 238, and the cases still fell out of the chambers easily.

If what you want are 185 grain JHPs at hyper velocity, then the Colt will disappoint. Well, not exactly disappoint, as it can match the .45 ACP, fps for fps, with 185 and 200 grain bullets. But if your expectations are more along the .44 Magnum velocity line, then you are not going to be a happy camper.

Which to me is its charm. As I've said before and will repeat again and again – if what you want is a .44 Magnum, go get one. I don't buy handguns in .45 Colt in order to turn them into hand-held anti-tank weapons. The basic old performance specs are good enough for me, and seem to be so for a lot of other shooters.

If anything, a lot of shooters want to ease up on the powder, not mash the pedal to the metal. As in, cowboy loads. Not the original cowboy loads, although there are some shooters who do actually want to be shooting cartridges loaded with black powder. No, the idea is to conform to the rules of Cowboy Action Shooting, where you have to use lead (not plated nor jacketed) bullets and velocities under 1,000 fps.

CAS shooters fire on steel plates, cut to various shapes, and those plates do not have to fall over in order to be scored as a hit. The plates tend to be close, and take many hundreds or thousands of this. If your load damages them, not only does the club incur the expense of repairing/replacing them (which they may well require you to reimburse), but shooters following you may be injured if the damage is not discovered right away.

Also, matches are scored by time, the fastest shooter wins. So there is a real incentive to shoot "softie" loads. However, and the reason we're going into detail here, the capacious .45 Colt case makes reduced loads problematic.

Large cases and small powder charges create positional problems. Sometimes the powder is slumped up against the primer, sometimes it is bunched against the base of the bullet, and other times it is in a smooth line between and below them. Each poses a different environment for the primer to ignite the powder charge. The need for bulky powders has brought shooters in the past to experiment with either the fastest-burning powders (to minimize the differences between burn rates due to position) or medium-rate burning powders with some bulk, and "leaning" the charge out to brush against the lower limits of efficient pressures.

IMR solved that problem a few years ago with Trail Boss. The powder is so bulky that a plastic storage bottle meant to hold a full pound of other powders with room to spare holds a mere nine ounces of Trail Boss. In fact, this can lead to other problems. Some

With a little luck in chamber dimensions, you can even use .45 ACP bullets in the .45 Colt.

powder measures, scaled for standard pistol powders, cannot hold enough Trail Boss to drop a useful charge. My standard Dillon powder scale only opens up enough to drop some 4.8 grains of Trail Boss, where for some .45 Colt loads I need 5.5 to seven grains of it. Amazingly, you may need to switch to a magnum powder plate/bar to drop enough volume of Trail Boss to produce the velocity you need.

However, if you are looking to load low-recoil ammo, this is the way to go. A lead 180 grain bullet and six grains of Trail Boss (that "one pound" jug holding nine ounces of Trail Boss will produce 650 rounds of ammo) gives you a mild 800 fps or so.

BULLETS

While there is factory ammunition loaded with jacketed bullets, the reloaders among us will produce the vast majority of their ammo using lead bullets. The .45 Colt, unlike cartridges such as the .357 Sig, does not need jacketed bullets. On the low end are the "button" bullets, the 160 grain lead round nosed bullets, meant pretty much just for cowboy competition, up to the full-weight original, 255 grains. If your revolver has the dimensions to accommodate it without leading, you can do double-duty with .45 ACP bullets and load 230 LRN in both the .45s.

Bullet diameter depends on the peculiarities of your particular revolver or revolvers. Belling stem diameter has to match that of the bullet diameter you are required to use. A "one size fits all" approach will not work. We have already discussed one end of the mismatch: .454+ inch belling and .452-inch bullets. No neck tension. What of the other? A .452 inch belling and .454/6/8-inch bullets? Aside from squeezing bullet lube up out of the case (and eventually plugging your seating die) with each round seated, you will sooner or later crush a case. The too-fat bullet simply won't set right, and won't seat right.

Match them, to each other and the revolver, and do it right.

.45 COLT/RUGER

When the Ruger Super Blackhawk became available in .45 Colt, experimenters began loading it up. And up, and up and up. There is now a class of loads designed specifically for the Ruger, and they have a generally-recognized pressure ceiling of 25,000 CUP. Which is not the same as 25,000 psi. A lot of people have been doing this for a long time, and they have done well with it. Me, I'm not so keen on the whole idea. First, what does this get us? Extra velocity, for one. Where a maxed-out .45 Colt load with a 250 grain lead bullet would deliver just over 900 fps, the "Ruger load" with the same weight bullet (but different powder, obviously) boosts a 250 JHP to nearly 1,300 fps. To do that, you're burning literally twice as much powder. Now, what happens if you get a Ruger load into a Colt or Italian clone? For the first shot, perhaps nothing. But sooner or later the revolver is going to protest, and the only objection it can lodge is by breaking.

Worse, the "typical" Ruger load is not limited just to a 250 grain bullet, but uses some much heavier. The heaviest I can find data for are 360 grains in weight, and leave the shooters immediate vicinity at the rate of over 1,100 fps. The first one of those you shoot through a cowboy gun is probably going to break it.

If I want that kind of performance, I'll do it in cases that won't fit my relatively delicate SAA revolvers. The .454 Casull comes to mind, as does the .480 Ruger and .475 Linebaugh.

.45 Colt
(All loads suitable for use in either S&W N frame revovlers, or SAA and clones)

Bullet	Powder	Weight	Velocity	Power Factor
200 Oregon Trail RNFP	Titegroup	7.5	1021	204
200 Oregon Trail RNFP	Bullseye	7.4	1017	
200 Oregon Trail RNFP	WW-231	7.5	959	
200 Oregon Trail RNFP	VV-320	6.8	866	
200 Oregon Trail RNFP	Trail Boss	6.5	847	
230 Oregon Trail RN*	Bullseye	5.4	727	167
230 Oregon Trail RN*	WW-231	8	805	185
230 Oregon Trail RN*	PB	6.8	725	167
255 Berry's LC-FP	Titegroup	6.3	841	
255 Berry's LC-FP	WW-231	7.2	751	
255 Berry's LC-FP	PB	6.3	763	
255 Oregon Trail SWC	Bullseye	5.4	656	167
255 Oregon Trail SWC	WW-231	7.4	695	177
255 Oregon Trail SWC	AA #2	6.4	830	211
255 Oregon Trail SWC	AA #5	10.5	797	
255 Oregon Trail SWC	VV-330	7.4	931	237**

***0.452" diameter bullets, usually a .45 ACP use ** When I was seriously considering using a DA revovler for bowlign pin shooting, this was going to be my load. While "only" delivering 931 fps out of a 4" barrel, it was just under 1000 fps (6") and just over (8") with longer barrels. With a ported barrel for Pin gun, it was controllable and broomed pins off like there was no tomorrow. With the hard-cast Oregon Trails bullet, I have no doubt it would shoot clean through anything smaller than a Moose.**

Chapter Twenty One

.357 MAGNUM

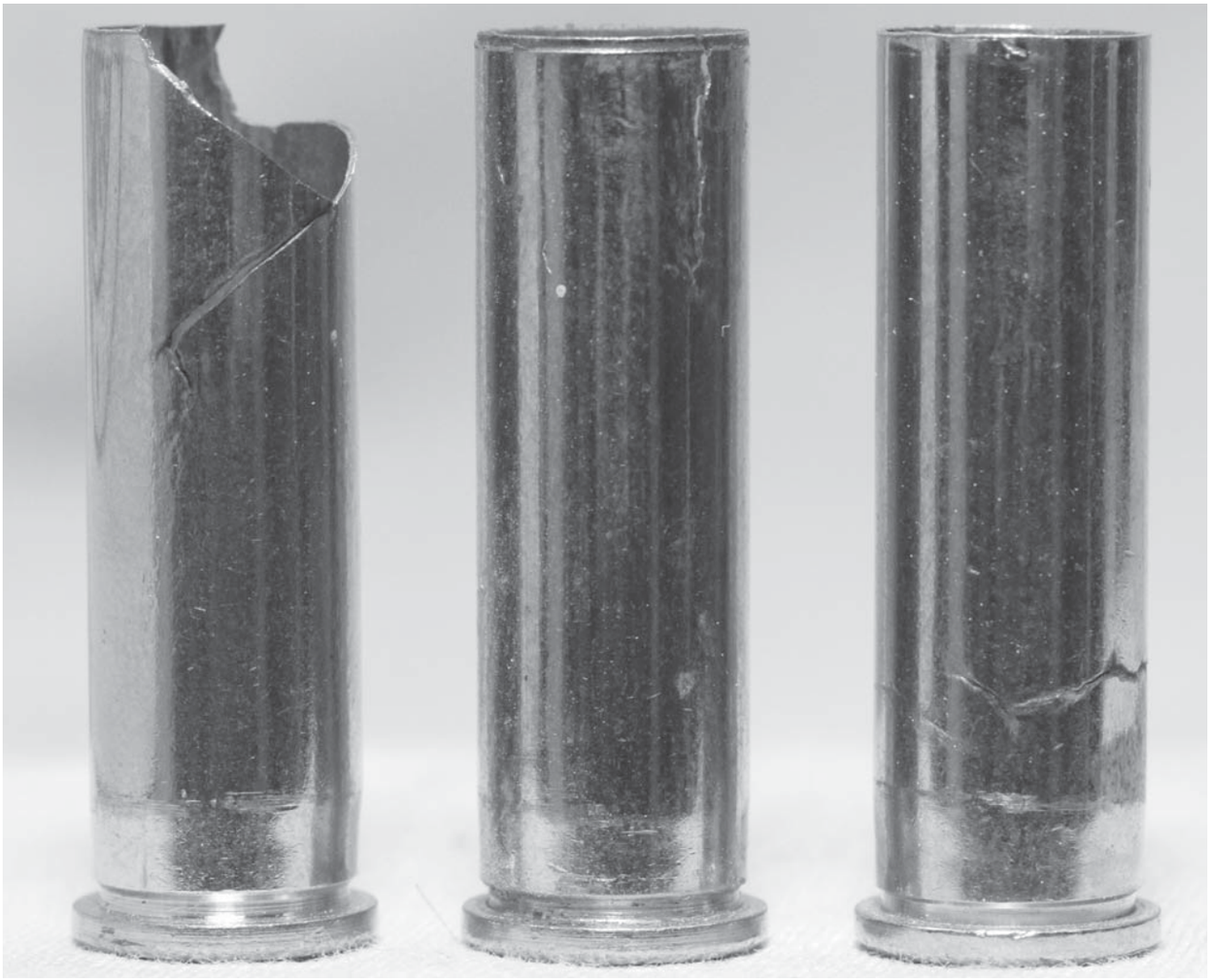
The .357 came about due to the efforts of Henry Ford. No, really. Basically, in a generation, transportation in America changed from horse-drawn to horsepower. Bad guys drove cars. And back then they were made from heavy-gauge steel. The common .38 Special, .38 S&W and various .32s in common use skidded off. And, in those days, once someone was gone, they were gone. Nationwide manhunts were rare, and only the most notorious were given that "honor." Also, before the formation of the FDIC, if a bank robber got out of town, he and the townspeople's money were gone.

So, you shot fleeing felons, even when they were in cars, and in the back if that was all you had as a target.

The ammo companies came up with the .38-44 HV, a higher-pressure .38 Special loading that offered some improvement, but not a lot. Colt came out with the Super .38, a real hole-puncher. Its fmj 130 grain bullet, at a listed 1300 fps, sliced through cars and the rudimentary body armor of the day. S&W had to do something, and what they did was the .357 Magnum.

Essentially, it is the .38 Special with the case lengthened (to preclude chambering in .38 Special revolvers) and with the operating pressure nearly doubled.

The customary load features a 158 grain bullet. When the improvements in bullet and powder design allowed more than a generation later, the 125 grain bullet became



For some reason, the nickel-plated .357 magnum brass is the worst when it comes to case cracking. I've had some do this after a mere handful of loadings.

popular, as it offered much greater "stopping power," less over-penetration and somewhat less recoil. At the other end, the 180 grain bullet became popular for hunting, as it offered more of everything: penetration, energy, recoil.

You can load the .357 down to .38 levels. Simply take a customary .38 Special load, bump the powder charge up perhaps 10 percent (to account for the extra case capacity) and shoot it as if it were a .38. Or, just shoot .38s in your .357, as the case will fit. However, there can be a slight problem. If you are using .38 Special cases and loading lead bullets, and if you do not properly clean the chambers, you can have a problem.

In such a combination, the powder and lead residue from the Special case will collect in the gap between the end of the Special case and the end of the .357 chamber. When you insert a .357 Magnum in that chamber (or all six), the magnum case will extend over the ring of collected gunk. When the much higher pressure of the fired .357 Magnum is done, the empty case may be wedged in place, hammered against the collected gunk. If you shoot .38 Specials, clean your chambers.

As a high-pressure round, and one with

a long case, the Magnum can be a bit more difficult to resize. Do not be alarmed if you find loading magnums to be more work than loading Specials. Also, if you plan to get a lot of service out of your brass, avoid the nickel-plated ones. Yes, they look good and clean up nice, but I have found that the nickeled cases crack much more quickly under any use, but especially under hard use, than the plain old brass ones.

When I was shooting bowling pins regularly, I found that the 180 grain bullets worked better than the 158s did, and even heavier was better. I finally found a source of 230 grain full-wadcutter bullets. They were not meant to be loaded flush, like target wadcutters, but full .357 Magnum length or close to it. Boosted to 900 fps, they took pins off the tables as if someone were standing at the table and hitting the pins with a baseball bat. Alas, now that bowling pin shooting is a fading pastime, they do not get called upon much.

As far as loading goes, the .357 uses the same dies, neck expander and other items as the .38 Special, with one exception, hunting loads.

If you are planning on loading the heaviest of bullets to the highest velocities with the slowest of powders, you would be well-served to change from a taper crimp to a roll crimp. You will, however, have to also trim cases (the roll crimp being more sensitive to length than taper crimp) and it would be wise to

Common loadings for the .357 call for 125 JHPs at high speed, stout loads with 158 grain bullets, and for those who wish to have some easy practice, wadcutters. Here we see Rainier DEWCs, in the middle.

do all this to a small, uniform batch of brass from the same box or batch of cases. Say, one or two boxes of a once-fired brass-cased (not nickel) batch, for example. The trimming, testing and sorting won't be too much of a hassle, because you aren't going to be loading five-gallon buckets-full of this load.

As a minor note, and one that only the most cheapskate among us might consider, you can use 9mm bullets in a .357. You will, however, have to use a 9mm neck expander (and maybe even custom-polish one smaller than that) in order to have sufficient neck tension. If you do not, your loaded bullets might just drop down on top of the powder charge from lack of neck tension. I discovered this when I had 50,000 9mm lead bullets for my .38 Super, just as IPSC Open competition was switching to jacketed. If you don't have that problem, don't look on this as an excuse to go using 9mm bullets.

BULLET DIAMETER, ETC.

Unlike older cases, the .357 has always had quite uniform dimensions. Jacketed bullets should be .357 inch and lead .358 inch, and you will be hard-pressed to find a revolver that needs some other size. The very first .357 Magnum cases were made with large pistol primers. However, unless you run across a batch of cases literally made during the Great Depression, you need not worry. Ever since the change, they've been small pistol primers.

The max pressure of the .357 Magnum is 35,000 psi, and there really is no good reason to try and stretch that to more.

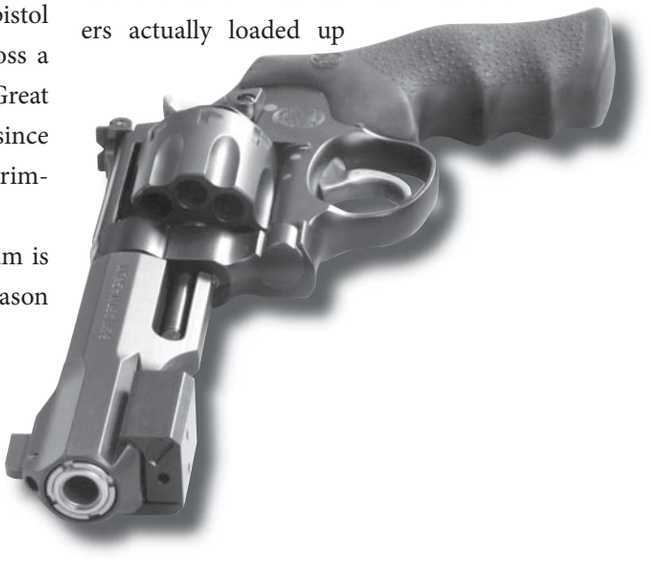
LONGEVITY

At full pressure, cases won't last long. The .38 Special can be reloaded dozens, even more than a hundred times, if cared for. In my experience, brass cases in .357, loaded to max, will last a couple of dozen firings. The nickeled one, less. While that may not seem like much, consider the numbers. If we take a single box of .357 Magnum and reload each 25 times (that's a couple of dozen, plus one) you will get 1,300 firings out of them. The first, plus 25 each, times 50. That's a lot of full-house magnum practice.

If you load lighter, you'll get more. Now, if you want to shoot, say, USPSA competition, with a .357 Magnum revolver (few do these days, but just go with it for a moment) you don't have to go full-power. To make the 170 PF, you need only take a 158 grain cast bullet and boost it to 1,100 fps. To do that will only require a small bit more than .38 Special+P pressures, and there your Magnum brass will last a good, long time.

AVAILABILITY

There was a time when getting .357 brass was kind of tough. Most of what people shot when I started reloading was either .38 Special or .45 ACP. So much so that some reloaders actually loaded up



.357 Magnum loads in .38 brass, "because it was cheap." It was also not very smart. Then, things shifted and lots of police departments switched from .38 practice to .357 practice. That pumped a lot of .357 brass into the marketplace.

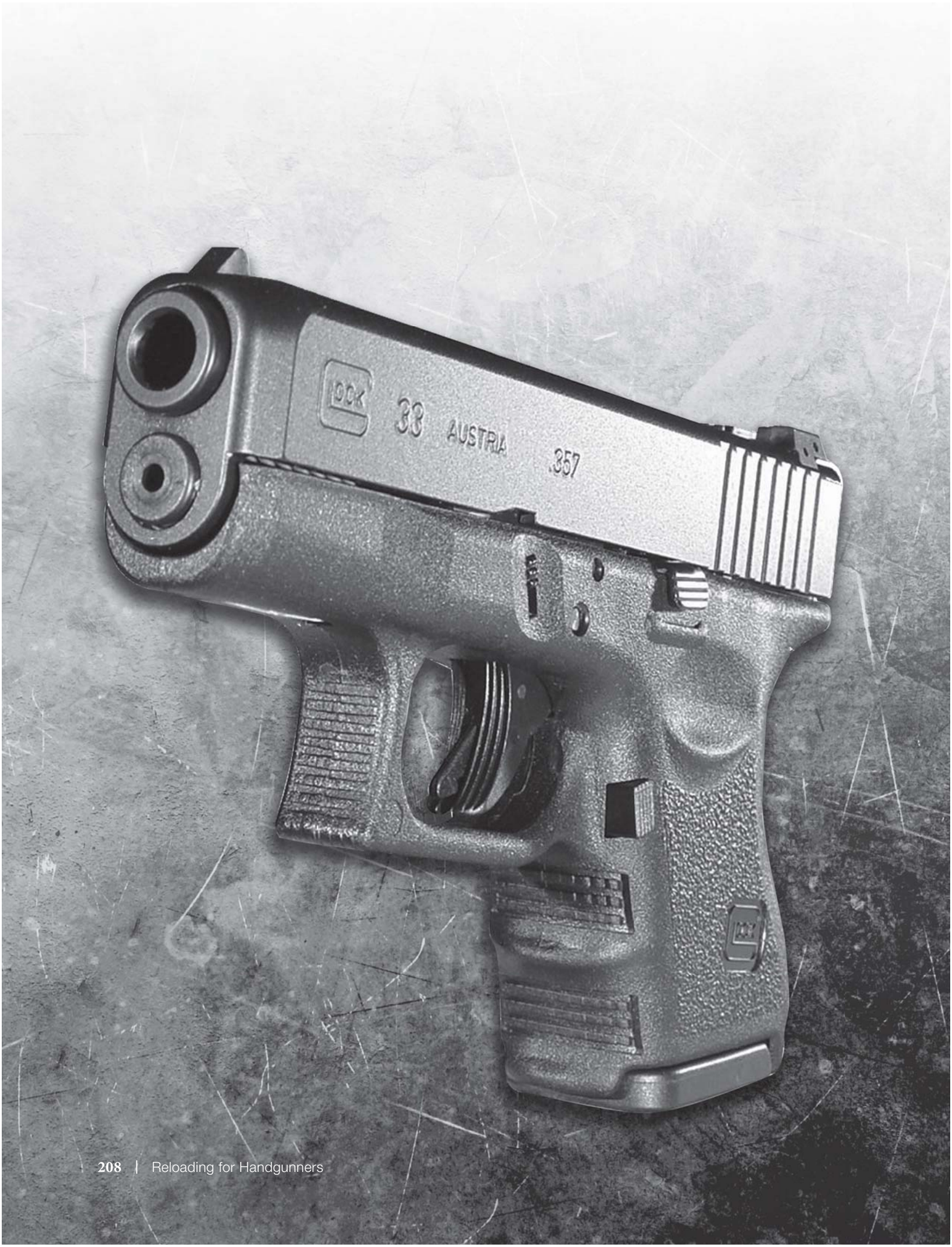
When police departments switched to pistols, 9mm became the common brass, and .38 and .357 diminished. Now, 9mm, and in some areas 40, is so common that commercial reloaders don't pay brass exchange prices for it. They pay copper commodities prices for it (less than as reloadable brass) simply because there is so much.

That leaves .38 and .357 behind, but not so rare it is difficult to find. You just have to pay its real worth as reloading brass, not just as scrap copper. Then again, what with the fluctuations of the commodities markets, the two values may not be so different from time to time.

.357 is relatively common, and you can find it most places you'll go. You just won't find any bargains.

.357 Magnum, S&W M-28, 6" barrel			
Load	Powder	Weight	Velocity
125 Oregon Trails RN	Titegroup	3.9	1011
125 Oregon Trails RN	Titegroup	4.2	1079
125 Oregon Trails RN	WW-231	4.4	1032
125 Oregon Trails RN	VV-320	5.1	1057
125 Berry's FP	Titegroup	3.9	999
125 Berry's FP	Titegroup	4.2	1063
125 Berry's FP	WW-231	4.4	1001
125 Berry's FP	VV-340	5.8	1027
148 Oregon Trail WC	Titegroup	2.9	789
148 Oregon Trail WC	Titegroup	3.2	843
148 Oregon Trail WC	WW-231	3.1	827
148 Berry's HBWC	Titegroup	3.2	801
148 Berry's HBWC	Titegroup	3.4	851
148 Berry's HBWC	WW-231	3.4	863
148 Berry's HBWC	VV-320	3.4	837
158 Oregon Trails RN	Titegroup	4.6	1031
158 Oregon Trails RN	Titegroup	5	1121
158 Oregon Trails RN	HP-38	5	1130
158 Oregon Trails RN	VV-340	6.1	1173
158 Berry's FP	Titegroup	5.4	1151
158 Berry's FP	WW-231	6.3	1172
158 Berry's FP	VV-320	6.5	1149
125 Hornady XTP	Autocomp	7.6	1370
125 Hornady XTP	HS-6	9.9	1501
125 Hornady XTP	SR-4756	6.8	1307
158 Hornady XTP	Autocomp	6.4	1083
158 Hornady XTP	HS-6	8.2	1207
158 Hornady XTP	H-110*	15	1421
158 Hornady XTP	VV-3N37	8.4	1259

** Do not reduce H-110 below this minimum. It does not take well to reduced charges.*



Chapter Twenty Two

.357 SIG

The .357 Sig came about due to a perceived need. That need began back when Evan Marshal and Ed Sanow were putting together their take on stopping power. What they did was simple and brute-force; they collected data on all the shootings they could. They then figured a way to present the information in a relative stopping power format. The process was (and still is) fraught with all kinds of problems. But the tabulations turned up an interesting detail: the best "stopper" of all was the .357 Magnum loaded with 125 grain jhp bullets.

The 9mm loaded with the same bullets could not churn up as much velocity, and thus fell short in stopping power.

That was in the late 1970s and early 1980s. Fast-forward a decade or so and pistols are the dominant sidearm in police. Hardly anyone carries a .357 Magnum any more. So, how to get the velocity? Increase case capacity. The 9mm can't do it, the .38 Super comes close but doesn't fit typical police sidearms. So, the .357 Sig was invented. It essentially (but not as a practical matter) is the .40 S&W necked down to 9mm. You can't just neck cases down, however, as they'd be too short, and short in the critical part of the Sig, the case neck.

The case neck of the .357 Sig is short, only 0.275 inch long, and it holds a .355-inch diameter bullet in place. You do not want to get cases shorter than that, so don't neck down found .40 brass in an attempt to make "cheap" .357 Sig brass. It will end up as an expensive shortcut.

The .357 Sig also runs at the maximum pressure for a self-loading pistol, 40,000 psi.

The plan with the Sig was to make a pistol cartridge that attained the velocity of the .357 Magnum. Mostly, they succeeded.

(Someone will be tempted to write in and point out the 9mm Win Mag. My reply: Find me a factory-made pistol in that chambering, and you win.)

The end result is a cartridge that performs but requires you, the reloader, be on your toes and aware of every detail. Your neck expander has to be tight and you do not want to be using even a 9mm Parabellum expander, you want one a few thousandths smaller than that. Your crimp has to be a taper crimp, and it needs to be ironed down hard. Better yet, crimp into a cannelure, as bullet setback in a 40,000 psi cartridge is not a pretty sight.

And finally, the overall length of the loaded cartridge is unforgiving, so you need to load full-length, but you need to keep it within the magazine limits. This can pose a problem, as many 9mm bullets are too long, forward of the case mouth, for the magazine space available to the .357 Sig.

You also have to be very careful about re-

While there is some argument as to where the Sig headspaces – mouth or shoulder – you have to control shoulder location in sizing, or your pistol may not be happy with your ammo.

Keep in mind that your magazine size controls cartridge overall length, and making your ammo a smidge too long just won't work. Hornady XTPs work.

sizing. There have been some claiming that the .357 Sig headspaces on the case mouth. That may be, but with that (relative to the case mouth) big shoulder there, you have to pay attention. If you allow the shoulder to creep forward (not sizing it back enough each time) you'll find yourself with non-chambering reloaded ammo. If you set the shoulder back too far in resizing, you create excess headspace. While the pistol will likely work fine, you'll have two problems. One, your primers will be flattened, appearing to suffer from excess pressure. And two, your cases will either be over-worked or stretched. In either instance they will have a short and unhappy life.

What do you get for all this fussing? Speed, and lots of it. The bullet weights are pretty limiting, with most factory loads having only 115 or 125 grain bullets. Those are often launched at nearly 1400 fps. Hornady offers a 147 grain XTP, and this is a screamer, too, with a listed speed of 1225 fps. Realize, however, that you get this only from full-sized pistols. And there's the rub. Out of a five-inch 1911 the Sig is a screamer, and squirts bullets out on flat-trajectory paths. Out of a typical police sidearm with a four-inch barrel, it is a shouter, and you get a useful but not startling increase over the speed of a 9mm +P load.

What is startling is the noise and blast. So, if you want the speed, you have to use a full-sized pistol to get it. Otherwise you're spending a lot in noise, blast, recoil and lost capacity to gain some but not all you could.

The Second Chance bowling pin match has been gone now for over a decade. Were it still going, the .357 Sig would be an interesting choice. A 147 grain JHP at 1250 fps is just a bit on the light side as far as Power Factor goes. But put it into a compensated 1911 (5.5-inch barrel, comp to dampen recoil) and you could have a very controllable pin gun.

Some might ask, if the 40 necked down is good, wouldn't the 10mm necked down be even better? It has been done. In the early

1990s, the 9x25 Dillon debuted in USPSA competition. It was used by some few USPSA/IPSC competitors with the idea not of maximum speed (although it could do that) but to feed gas to the comp. They succeeded, but all too well. With light bullets, you could shovel eye-opening amounts of slow-burning powder into the case. The result was a load that with some compensator designs actually pushed the muzzle below the line of sight. The noise was ear-splitting, the recoil abusive on elbows and shoulders, and the lost magazine capacity hard to overcome. It died a quick death, almost as quickly as the burned-out barrels it created.

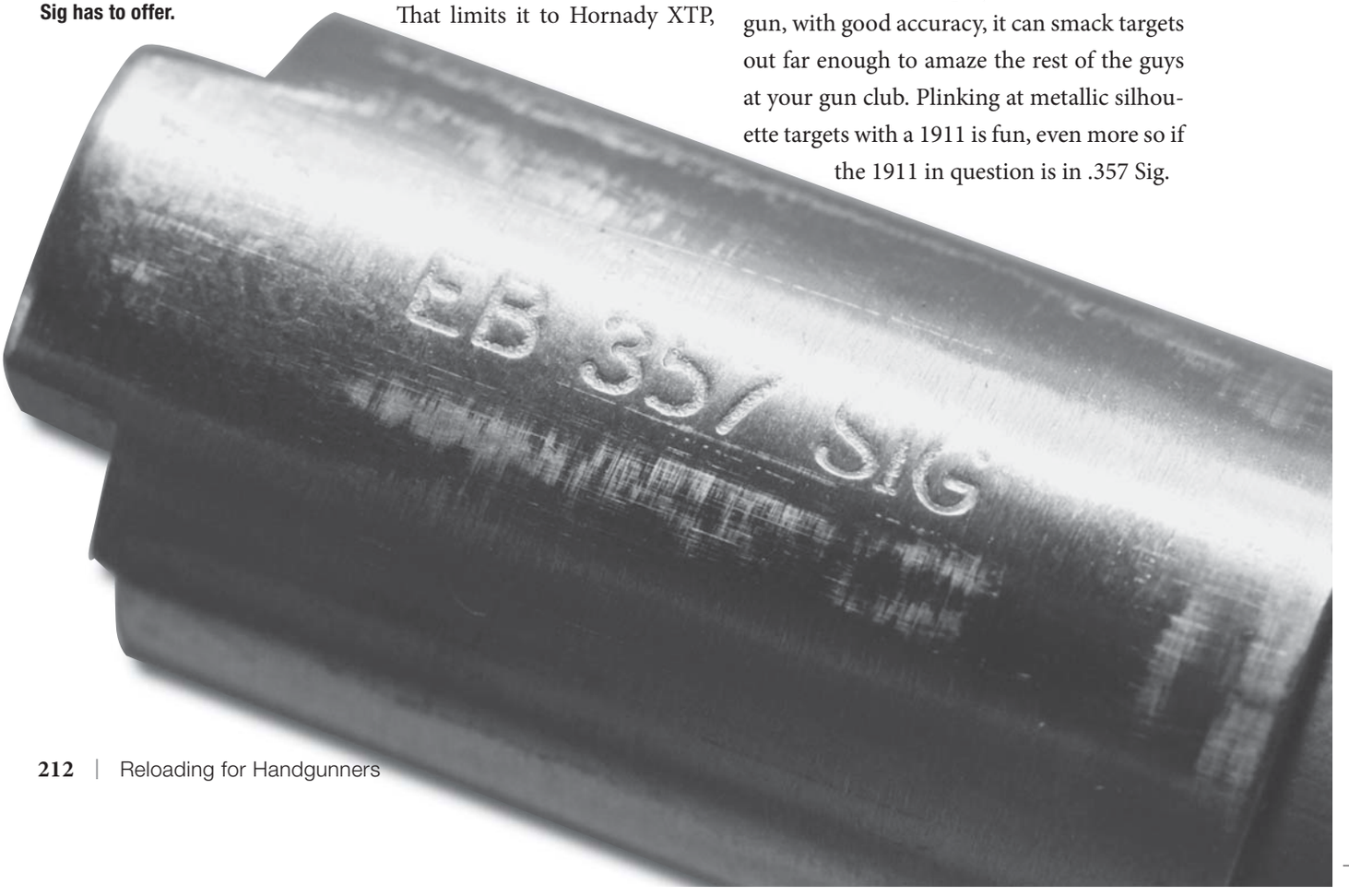
BULLETS, ETC.

The .357 Sig bullets are standard 9mm bullets, but you are limited to those short enough to crimp properly and still fit the magazines. That limits it to Hornady XTP, 90, 115, 124 and 147 grains, and the Speer Gold Dot 125 GD. There is no good reason to be screwing around with lead bullets in the .357 Sig. If you want soft recoil you are far better off using a different caliber. Lead and plated bullets will not be happy with the velocities generated by the Sig, and if you are happy with less speed, why are you using the Sig?

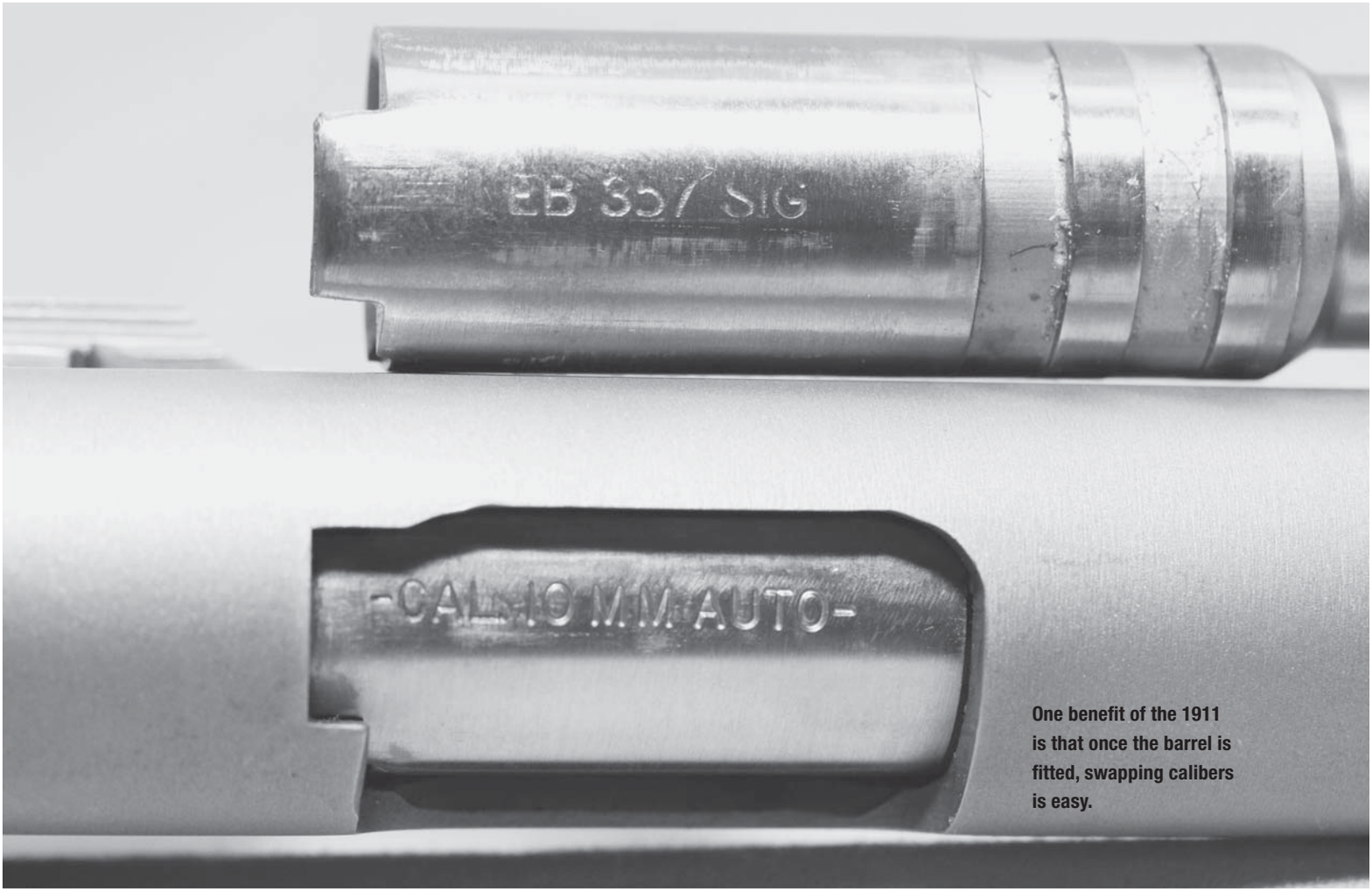
The short neck means you have all but the shortest bullets protruding down into the combustion chamber, exposed to hot gases. You can't load long, as even the 1911 doesn't allow for much, and then you have no place to crimp.

No, the Sig is perhaps the most specialized cartridge to be found in a handgun, certainly in a pistol. It is what it is, and there is not much profit, if any, in trying to make it something else.

But it can be fun to play with. In a full-sized gun, with good accuracy, it can smack targets out far enough to amaze the rest of the guys at your gun club. Plinking at metallic silhouette targets with a 1911 is fun, even more so if the 1911 in question is in .357 Sig.



The full-length 5-inch barrel in a 1911 gets all the velocity the .357 Sig has to offer.



One benefit of the 1911 is that once the barrel is fitted, swapping calibers is easy.

.357 Sig 1911 5" barrel
(The .357 Sig is used for its maximum velocity, thus no plated bullets nor cast bullet testing)

Bullet	Powder	Weight	Velocity
90 Hornady XTP	WW-231	7.4	1421
90 Hornady XTP	HS-6	10.2	1589
90 Hornady XTP	Unique	8.5	1381
90 Hornady XTP	VV-340	8.6	1601
115 Hornady XTP	HS-6	9.2	1386
115 Hornady XTP	Longshot	9.8	1437
115 Hornady XTP	VV-340	7.6	1429
124 Hornady XTP	HS-6	8.8	1320
124 Hornady XTP	Longshot	9.1	1391
124 Hornady XTP	VV-340	7.2	1369
147 Hornady XTP	HS-6	7.5	1181
147 Hornady XTP	Longshot	7.4	1237
147 Hornady XTP	VV-340	6.7	1240

Chapter Twenty Three

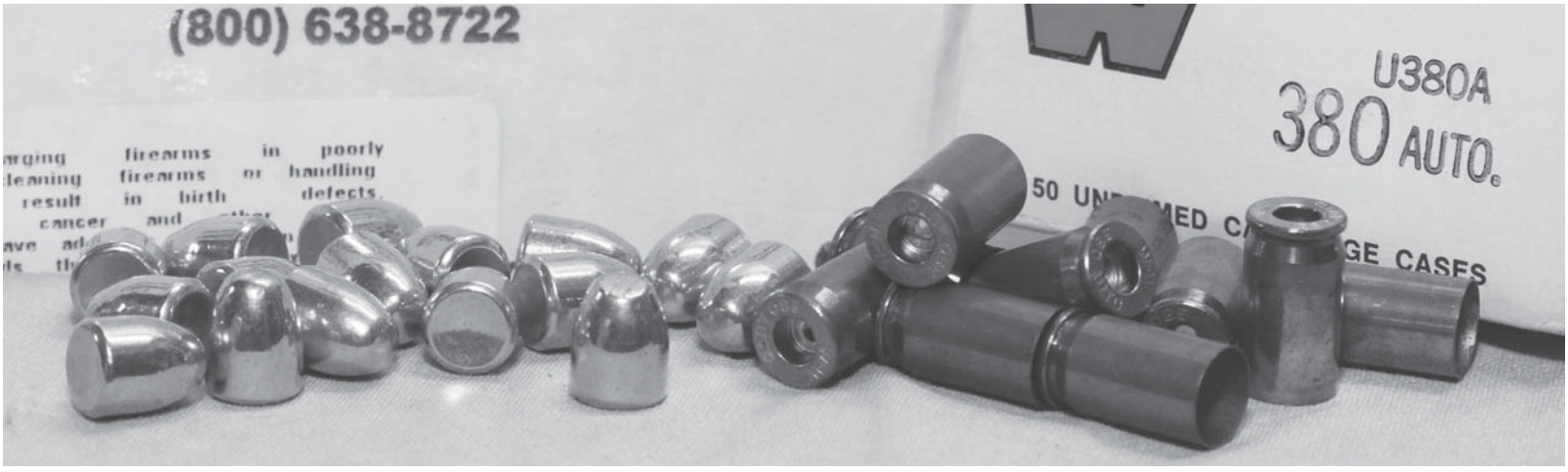
.380 AUTO

The big brother of the .32, the .380 is likewise a Browning design. Even more than the .32, it can be found with multiple monikers: .380 ACP, 9mm Browning, 9x17, 9mm Kurz, 9mm Short, and all those in multiple languages and alphabets. Unveiled in 1908 in the Colt Pocket Hammerless, I suspect it was the biggest cartridge Browning could fit into his already existing and excellent pocket pistols.

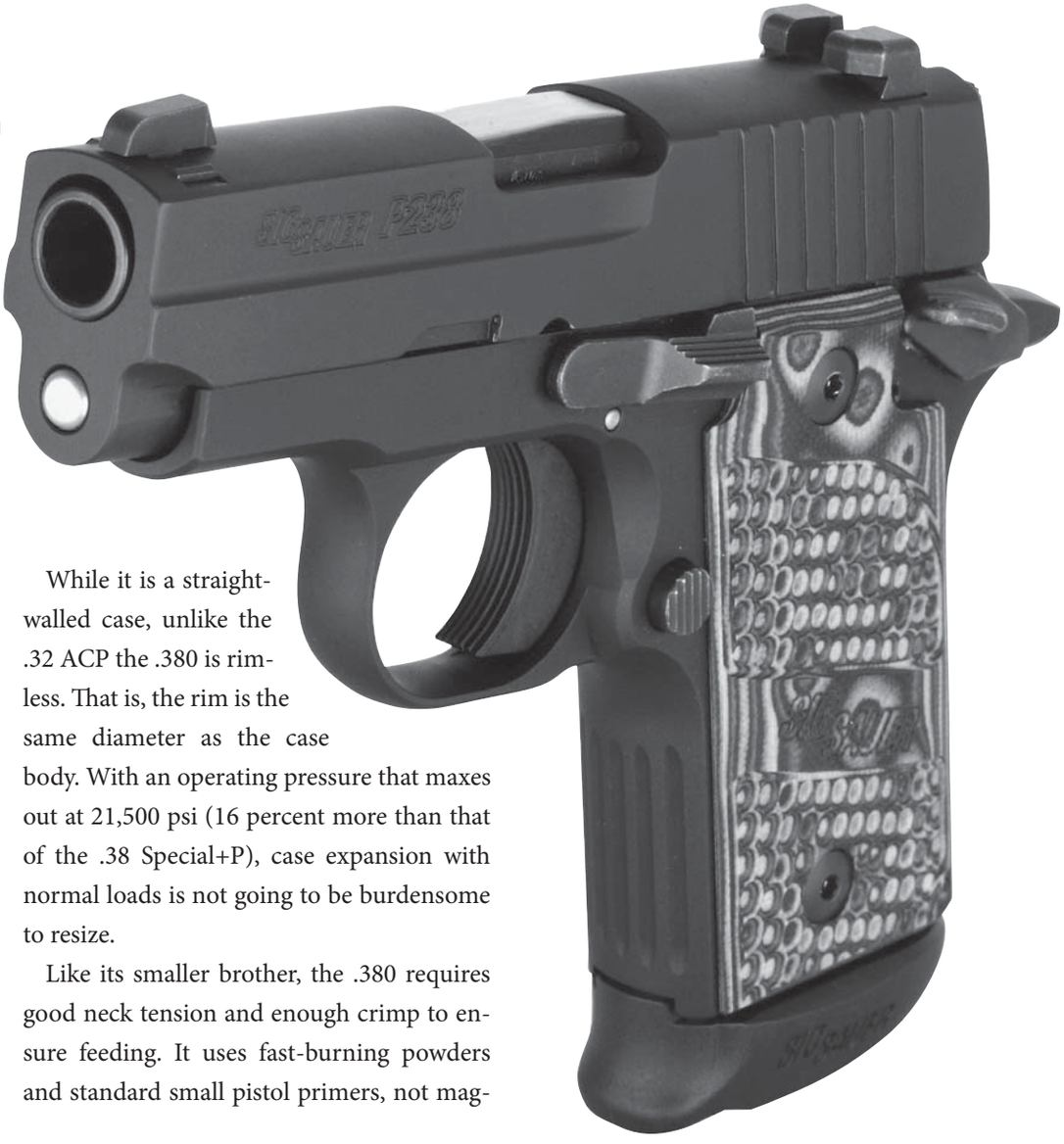
More so than the .32, the .380 was viewed in Europe as sufficient for use as a sidearm in both military and police environments. As a result, it (like the .32) has been chambered in an endless array of small and medium pistols, most of them blowback. Almost without exception, if a pistol was chambered for one of these it was made in models chambered for each. With the advent of more-powerful .380 factory loadings there has been a trend towards locked-breech pistols, such as the Colt Mustang and the Sig P238.

In loading for the .380, as with many others, we aren't trying to improve on the vanilla-plain factory loadings so much as duplicate them for inexpensive practice.

In the defensive arena, we have stepped up in bullet design, operating pressure and in the potential for bullet expansion, all to make the little .380 into a bigger stick. The typical .380 bullet weight is 90, 95 or 100 grains, and out of a full-sized pocket pistol (if that isn't an oxymoron) we can expect close to 1,000 fps from the 90 grain bullet. Not that you want to be loading your own defensive ammo, but if you are depending on a factory load that pushes a 90 grain bullet at 975 fps, your practice load should be close to that, too.



Some brass, new in this case, some plated bullets, and a fast-burning powder, and you can easily have buckets of practice ammo.



Sig Sauer P238 .380 ACP

While it is a straight-walled case, unlike the .32 ACP the .380 is rimless. That is, the rim is the same diameter as the case body. With an operating pressure that maxes out at 21,500 psi (16 percent more than that of the .38 Special+P), case expansion with normal loads is not going to be burdensome to resize.

Like its smaller brother, the .380 requires good neck tension and enough crimp to ensure feeding. It uses fast-burning powders and standard small pistol primers, not mag-

The .380 is a well-behaved cartridge, with no bad habits, and few bullet choices. Pretty much round nose or JHP, between 90 and 100 grains.

num primers. A taper crimp to remove the mouth flare is enough, and too much doesn't gain you anything, so when you set up your dies there is no point in trying to cut the bullet in half with your crimp.

And also like its little, but older, brother, the biggest problem with the .380 is the size of it all. If you wear bigger than size medium gloves, the little cases and bullets are going to be fiddly little things to handle. Spend an evening with the .380, and moving back to the 9mm will make them seem large, and .40 or .45 cases will seem like hustling multi-gallon drums into and out of your loading press.

.380 ACP			
Bullet	powder	Weight	Velocity
100 Berry's RN	Titegroup	3	936
100 Berry's RN	WW-231	3.1	869
100 Berry's RN	Bullseye	3.1	911
90 Hornady XTP	Titegroup	3.4	1079
90 Hornady XTP	WW-231	3.5	1047
90 Hornady XTP	Bullseye	3.4	1028
90 Hornady XTP	VV-330	3.7	981
100 Hornady XTP	Titegroup	3	894
100 Hornady XTP	WW-231	3.2	872
100 Hornady XTP	Bullseye	3.1	889
100 Hornady XTP	VV-330	3.3	837

Chapter Twenty Four

.38-40

Introduced in 1874 by Winchester for their rifles, the .38-40 is a real head-scratcher. It is, for all intents and purposes, a .44-40 necked down to accept .401-inch lead bullets. So why make it? To this day, I'm not sure anyone really knows. But, it served its owners well, then and now, for Cowboy Action Shooting. (Back when the procedural penalty on two-way range CAS shooting competition was a spear in the chest, the .38-40 was well thought of.) That said, as it is a 19th century product it poses some real problems for the modern reloader. First is the matter of brass thickness, or lack thereof. More so than any other brass, .38-40 brass will not tolerate rough-housing, especially in the neck. Dent a case neck and you'll probably have to pitch it. The dent won't iron out in resizing or neck expansion, and will typically just fold or crack. Apply too much neck crimp and you'll fold or crease the case, and again it is done.

The .38-40 requires a light touch, a careful loading process, and is not happy with slam-bang efforts to speed up production. However, since you aren't going to be using it in a high-volume handgun (the most likely candidate is a single-action cowboy gun) you won't need to load five-gallon buckets-full at each session.

Second, the brass makers and the chamber reamers have not been able, even after 135 years, to agree on just where to put the shoulder of the case. As a result, you will start out with factory ammo having a shoulder that is lower on the case wall than what the chamber of your revolver has. When you fire factory ammo, the shoulder blows forward. If you fully re-size your case and shove the shoulder back down where it was, you'll be making for

The .38-40 suffers from many aspects of its late 19th-century origins. Thin case mouths, low pressure, large capacity. Still, with a bit of work it can serve you well.

short-lived brass. The only way to lengthen case life is to re-size just enough to shove the shoulder back only enough to clear the shoulder in the chamber, and no more. If you have several handguns in .38-40, you either have to have dedicated brass for each one of them or size your common-source brass back to clear the lowest shoulder of them. An alternative would be to have a gunsmith "regulate" the shoulder location of all your .38-40 firearms. Use the one with the shoulder the furthest forward as the standard, and have your gunsmith ream all the rest to match.

A note here: Since all my .38-40 revolvers are Italian clones of the SAA, I would have no problem in reaming them to match. (Luckily, I haven't had to do that.) However, if I had a Colt in the safe in .38-40, I'd be really leery of reaming its chambers to match something else. Especially if the Colt was not a 3rd generation, but an earlier one. Colts cost money, and those who worship them would be quite cross if you were to go messing with one.

One approach that some advocate to get thicker cases is to re-size .44-40 brass. This, however, presents other problems. The chamber neck diameter is typically reamed to the

There really is only one bullet weight for the .38-40; 180 grains, in a rounded flat-point shape.

loaded cartridge diameter, so if the resulting .44-40 down to .38-40 brass is too thick once loaded, your loaded rounds may not chamber in your .38-40 cylinder. And second, with the wrong headstamp on it, you're simply asking for trouble in the future.

No, if you'll permit a mild pun, you should simply bite the bullet and accept the limitations of the cartridge you have selected.

The .38-40 uses the same bullet diameter as the .40 and 10mm. This seems like a great thing, allowing you to use those bullets in your loads. Well, maybe. If the bullet you selected doesn't have a crimp groove, you might have problems. Or, of the groove is in the wrong location. As a result, you are limited to .38-40 specific bullets.

The thin case necks make some standard approaches to loading problematic. You can't go with an under-sized neck expander, to in-

Depending on your chambers, the case shoulder can move a lot in firing. Here, the factory shoulder location is closely matched to my chamber. Lucky me.

Except for the lucky owners of Colt New Service revolvers, and some Ruger dual-cylinder (10mm & 38-40) Blackhawks, most .38-40 revolvers will be single action Army or clones.

crease neck tension, because if you have the neck too tight it might buckle when you try to seat a bullet. Crushed cases are messy and costly. You can't apply an aggressive crimp, as pointed out above, plus it also might buckle a case. And finally, you're probably using relatively soft lead bullets, and the bullet may object to overly-aggressive approaches.

Finally, let's all agree that while the .38-40 was, and is, the 19th century equivalent of the .40 S&W, it is not the 19th century 10mm. There are some who delight in pushing the limits, and there are some who will load the .38-40 to 10mm performance. My fellow firearms author, Michael Bane, is one of them, and he even loaned me an S&W N-frame he'd had built up as a .38-40. In it, he squirts 180 grain bullets out in the near vicinity of 1200 fps. Me, I'm happy to stick with a 180 at 1000 fps, as I know the brass and all the firearms ever made for it will stand up to that just fine. I really don't want to be putting one of Mike's ".38-40 Magnum" loads into a first-generation Colt.

You'll find more than a few makers of appropriate bullets. These are from Rainier.

In an earlier era, the shoulder of the .38-40 was more pronounced. What do you want to bet they didn't care if this case was ever to be reloaded?

Crimp, gently, in the groove ahead of the lube ring.

BULLET DIAMETER, ETC.

Here we have another problem. While the bullet variances are not as bad in the .38-40 as they are in the .44-40, they can still wander. Modern revolvers (all those Italian clones) are going to be pretty good, with bores in the .400 to .401 inch range, and throats in the .402 to .403 inch range. But the .38-40 is not all that forgiving, and you may find that the "perfect" bullet isn't, and the "best" modern lubricant for bullets doesn't do squat for your leading.

If, in your search for a good bullet for your .38-40, you end up going down the road of bullet casting, don't blame me.

.38-40, Uberti 4.75" barrel			
Bullet	Powder	Weight	Velocity
180 Oregon Trail FP	Titegroup	6.4	959
180 Oregon Trail FP	WW-231	6.8	924
180 Oregon Trail FP	Trail Boss	5.5	789
180 Oregon Trail FP	VV-340	6.4	831
180 Oregon Trail FP	Unique	5.8	842

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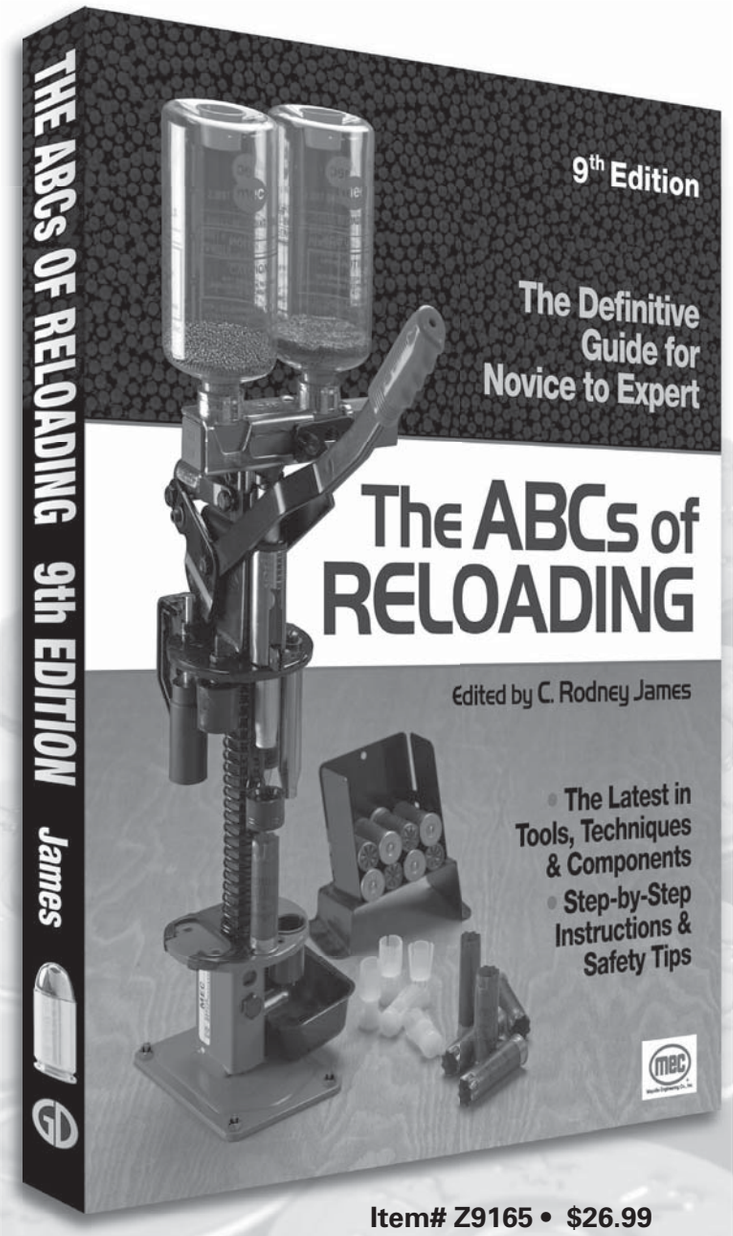

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Patrick Sweeney is a certified Master Gunsmith, film consultant, certified armorer instructor for police departments nationwide, and author of many of Gun Digest Books' best-selling titles, including *Gun Digest Book of the 1911 Vols. I* and *II*, *Gun Digest Big Fat Book of the .45 ACP*, *Gun Digest Book of the Glock*, and *Gunsmithing: Pistols & Revolvers*.

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